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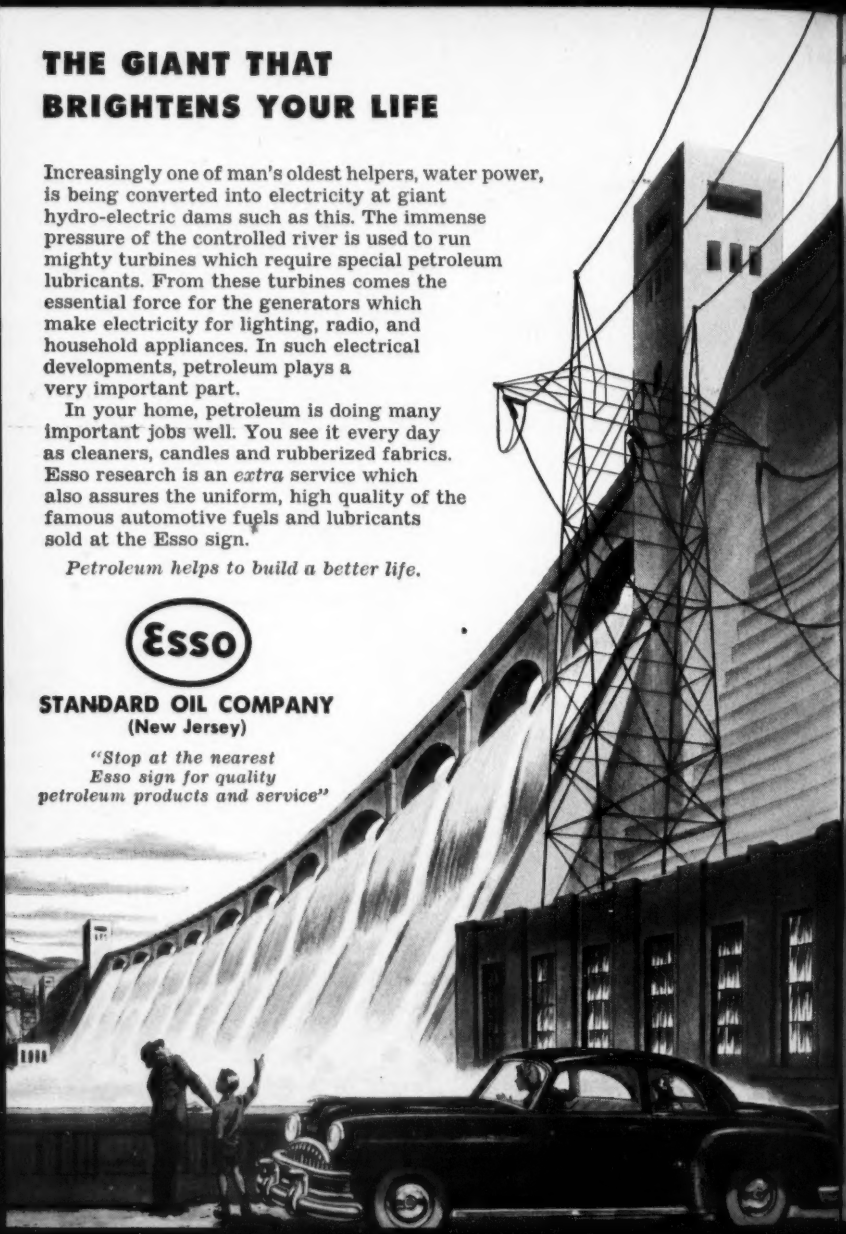

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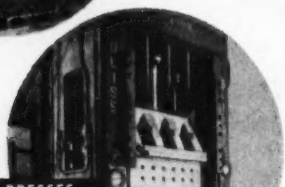

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John F. Chapman Publisher

AUGUST, 1949
VOLUME 4
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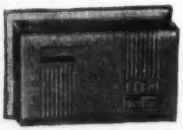
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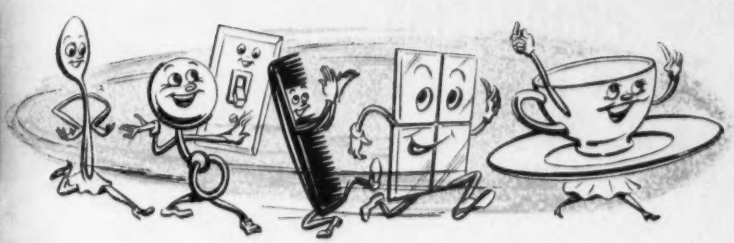

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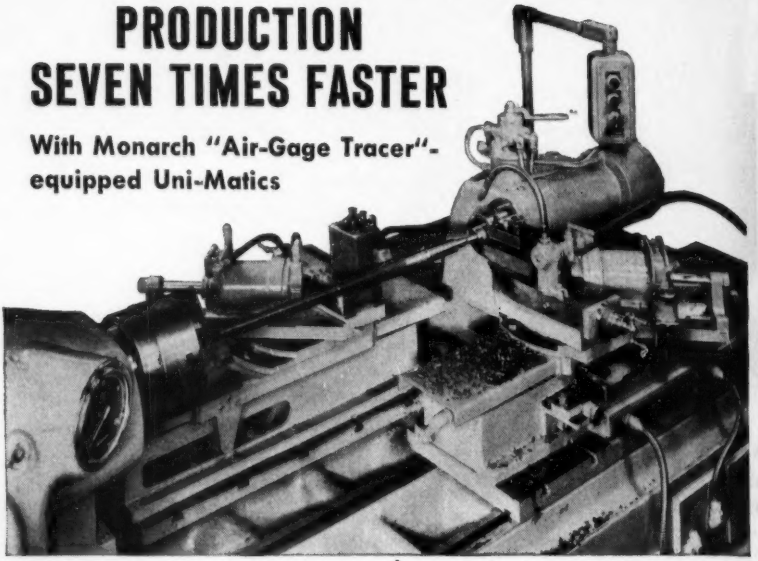

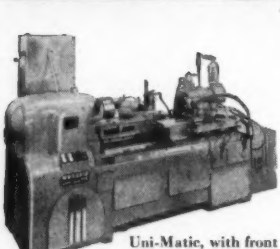

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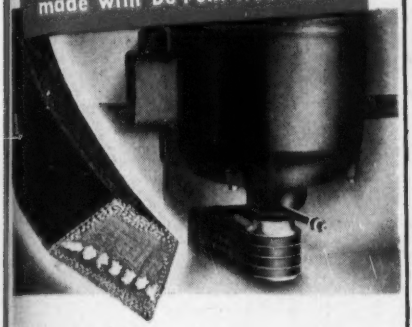

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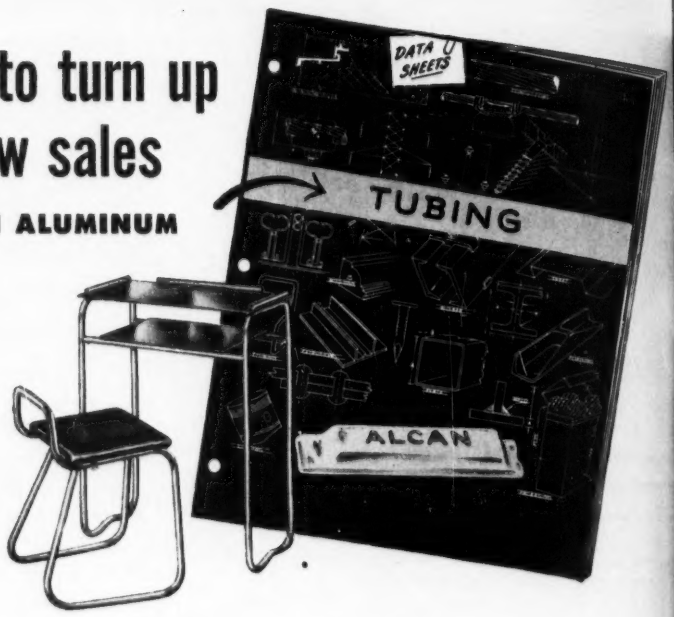

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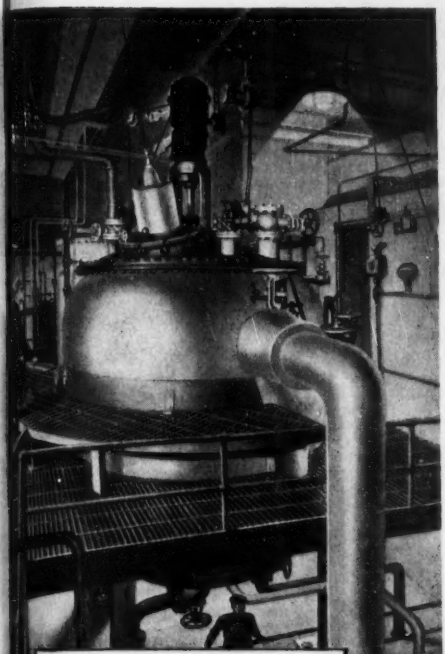

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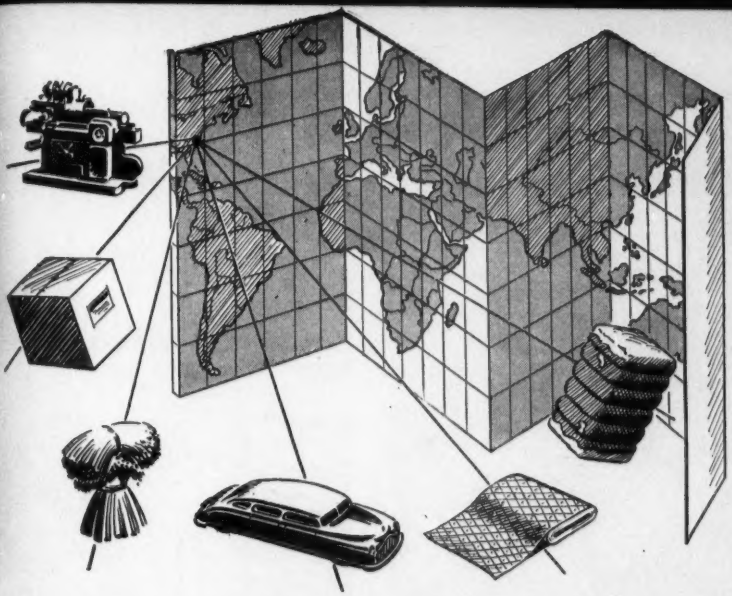

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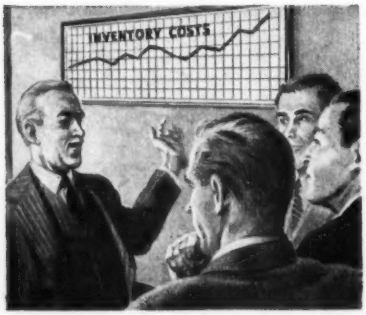

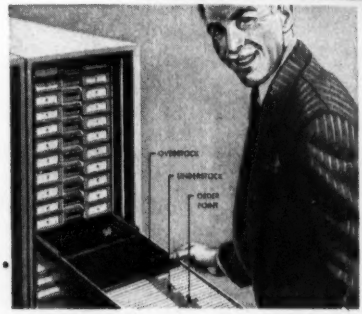

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Business Trends

INDUSTRIAL PRODUCTION in the U. S. is still declining more rapidly than was expected as late as in April of this year. And the decline is expected to last into 1950. But the "correction"—forecast in McG-H Digest, Dec. '48, p11—is taking place in an orderly fashion as industry after industry goes through its period of readjustment.

The index of industrial production in late June stood at about 170 (1935-39 = 100), this represented about a 12% drop in production from the postwar high of 195 in Oct.-Nov. 1948. Compared with previous readjustment periods, this decline is small. Following World War I, industrial production slipped 33% in 1920-22. And in 1937-38, following a 5-year upswing from depression lows, production again went down about the same amount—33%.

The decline throughout the rest of this year should be at a much slower rate. The index at the end of the year is unlikely to go below 160, although some government economists are more pessimistic and are talking of an even lower December index. The decline could be greater. At the present rate, it could touch 130 by year's end.

The bottom of the present decline is expected in the first half of 1950—at about 155 according to the more hopeful business analysts and possibly just below 150 according to the less hopeful. This would mean from 20 to 23% below the postwar peak and also slightly under the 1941 mark. The most optimistic expect, and probably it will be in vain, a leveling off as early as the third quarter of this year and a rise in the last quarter.

Durable-good production has fallen somewhat from its postwar high of 237 and is expected to fall further. But there is a wide divergence of opinion among government economists on the next December level—anywhere from 157-185. Automobiles and steel are important here. A drop in automobile sales is inevitable and what happens will have a vital influence on general business strength.

Production of non-durable goods is expected to hold up rather well—to decline only slightly by the end of the year, possibly by 6%. The outlook for minerals is strong as they should end the year at current levels or nearly so. But production and importation of non-ferrous metals will drop to bring supplies into line with demand.

There will be no depression, such as occurred in 1929, is unanimous opinion. Certain economic factors forbid it: there have been no dangerous farm-land speculation, no excessive inventory accumulation on borrowed money, no staggering stock-market debt. The banking system is strong. Farm prices are supported by the government, and exports aided by ERP.

Importantly, consumer demand is still active, and consumers still have the money to pay for the domestic and imported goods they want. It has been the

Business Trends (Continued)

reduction in business spending, not in consumer spending, that has been the major factor in the present readjustment.

Will the present decline end in a lower plateau of business activity or in an upturn? The answer to this question can affect world-wide business plans in both government and private affairs. You can look for renewed expansion in the summer of 1950.

Here are the reasons why: Price adjustments should then be ended, probable government inflationary (deficit) spending will turn basic-commodity prices upward, inventories can be expected to expand if prices go up, the money supply is expected to enter a new wave of expansion within a year, heavy construction may increase next year, and government fiscal policy will be directed toward expansion of employment.

Business men are not too much worried. Biggest worry is the high breakeven points facing most industries. So now more than ever, business leaders are looking at costs, figuring out ways to get them into line with production. Machine-tool makers, for instance, are getting plenty of attention when they can show a manufacturer a machine to do a job better, quicker, cheaper.

NOTES ON WORLD BUSINESS AND COMMERCE

European trade pattern for the next year can now be traced. As expected, more ECA funds will go for machinery, less for foodstuffs. Equipment for basic industries will be the main item. Surplus supplies of many commodities in the U. S. will force heavier buying there. Canada may earn $450- to $500-million, compared with $700-million last year. Brazil, Chile, Mexico will get fewer dollars from Europe, while Argentina should get more, possibly $75-million. Cuban sales also will probably be lower.

Iran has earmarked $656-million for economic development in the next 7 years. One fourth will go to agriculture, another fourth to transportation, another to industry, and the remainder to social and municipal improvements. Importation of consumer goods is being reduced to conserve funds for capital equipment.

Yugoslavia is having shopping problems. Facing a closing door to the East, Yugoslavia is keen on the idea of trade with the West, wants industrial equipment primarily. But barring any large loans (World Bank, etc.), goods must be paid for by marketable raw materials—worth under $250-million a year and not all in dollars. Chances for credit are dim.

India's foreign trade in fiscal year 1948-49 reached a record $2,823-million, compared with $2,406-million the year before. Imports topped exports—$1,554-million compared to $1,269-million, leaving an adverse trade balance of over a quarter billion. India will continue to be a good market for industrial goods, but special attention is now being given even to machinery imports in a rigorous effort to restore balance between export and import values.

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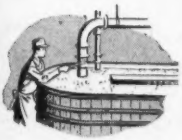

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DIELECTRIC STRENGTH	VERY GOOD	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
RESISTANCE TO MOISTURE	GOOD	EXCELLENT	GOOD	EXCELLENT	EXCELLENT
PENETRATING ABILITY	EXCELLENT	GOOD	EXCELLENT	EXCELLENT	GOOD
HEAT ENDURANCE	EXCELLENT	VERY GOOD	EXCELLENT	VERY GOOD	EXCELLENT
RESISTANCE TO ACIDS	GOOD	EXCELLENT	GOOD	EXCELLENT	EXCELLENT
RESISTANCE TO ALKALI	FAIR	EXCELLENT	FAIR	GOOD	EXCELLENT
RESISTANCE TO OIL	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
TOUGHNESS	GOOD	EXCELLENT	VERY GOOD	EXCELLENT	EXCELLENT
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Washington Report

RECIPROCAL TRADE PROGRAM is running into its first hard economic (as distinct from political) test in a number of years. If domestic business conditions in the U. S. continue slipping (see p13), the threat of reversing the downtrend in U. S. tariffs can become substantial.

The attack comes largely through attempts, by domestic producers in trying to head off more foreign competition, to force President Truman to invoke the "escape clause" in trade pacts. This clause permits the U. S. to rescind or modify tariff concessions.

Test case to watch involves spring clothes pins. They are imported from Sweden and Mexico, and made also in Maine. Maine producers have gotten the U. S. Tariff Commission, an agency responsible to Congress, to hear their case: that imported clothes pins, duty-paid, are selling one-third less than the domestic product. They want the U. S. to invoke the escape clause, cancel the 50% tariff cut granted in the pact with Sweden.

This is the first escape clause case ever to get a formal hearing. And U. S. producers of many other items in competition with foreign products are waiting to get their cue from the outcome.

President Truman and Secretary of State Acheson will sidestep any invocation of the escape clause just as long as possible. Their policy still is that it is good business—as well as good international relations—to maintain high level international buying as well as selling. They realize that any use of the escape clause by the U. S. would only bring retaliation from abroad. That means, they feel, simply shifting any economic difficulties from one business to another in the U. S. itself.

"LITTLE MARSHALL" PLAN FOR KOREA is a U. S. attempt to shift the occupation objectives from simple relief to rehabilitation and recovery. There are East-West "cold war" implications, of course. Getting Korea onto its feet economically would give the West a worthwhile Pacific outpost right at the Iron Curtain. In addition, Korea long has fairly successfully nurtured sympathy in U. S. domestic politics.

Economic Cooperation Administration will run the Korean Marshall Plan. Officials at ECA estimate that probably about one-third of the raw materials and equipment for the program, roughly $150-million in fiscal 1950, will be purchased outside the U. S. Most of this offshore buying will be in Japan. Big exception: petroleum products of nearly $10-million, probably from Saudi Arabia or Indonesia. All buying will be on competitive bidding.

By major commodity groups, the Korean program includes: $29.7-million for commercial fertilizer and agricultural supplies (mostly from U. S.); $27-million

Washington Report (Continued)

for raw and semi-finished materials, mostly cotton (from U. S.) and lumber (probably from Philippines); $4.5-million for iron and steel products, electrical apparatus, mining, and other industrial equipment (mostly from Japan); $36.6-million for ocean freight (half for U. S. bottoms).

Recovery projects scheduled (total $31.8-million) include $3-million for coal mining; $6-million for 200 fishing vessels; $5.7-million for electric power; $4-million for cement. Also projected is a $730,000 reconstruction of the Kimbo Airport at Seoul, to be operated by the U. S. Civil Aeronautics Administration.

BOLIVIA'S TIN STRIKE has reacted to keep the U. S. wartime import allocation controls over tin and tin products in effect for another year. Commerce Secretary Sawyer had planned to let the last remaining war controls expire on June 30. Loss of an estimated month's production in the May-June strikes and rioting, however, caused Sawyer to ask Congress to extend tin controls through June 1950. U. S. has been taking one-half of Bolivia's output of 35,000-40,000 tons a year.

BRITISH POSSESSIONS in Africa are recommended by the U. S. Chamber of Commerce, a non-government association of businessmen, as a field well worth consideration of U. S. private investors. Particularly suggested are investment projects for production of such dollar-saving items as agricultural small tools, tractors, light railway materials, general hardware, bicycles, typewriters, fertilizers, artisans' tools, enameled hollow-ware, building materials.

To open the door to U. S. investment in this resource-rich area, the Chamber suggests these policy principles must first be established by the colonial territorial governments: agreements to safeguard U. S. investment from discrimination; encouragement to foreign borrowers to seek funds in private money markets; avoidance of an "industrialization-at-any-cost" philosophy; and access to essential raw materials, technical personnel, and markets.

INTERNATIONAL GLIMPSES

United Hybrid Corn Growers Assn. of Iowa has sent, at Peron's request, two experts to Argentina to demonstrate how hybrid corn and wheat seed can increase cereal production. Argentina hopes that widespread use of such seed would permit her, by upping yields, to sell grain at world market prices.

World Bank's new president, Eugene R. Black, is a banker's banker. He became a senior vice president of the big Chase National Bank in New York only last March, after 15 years there. He takes over the World Bank helm from John McCloy at a time when the institution's policy is subtly shifting from granting credits primarily for reconstruction to that of becoming a force in developmental programs such as Truman's point four.

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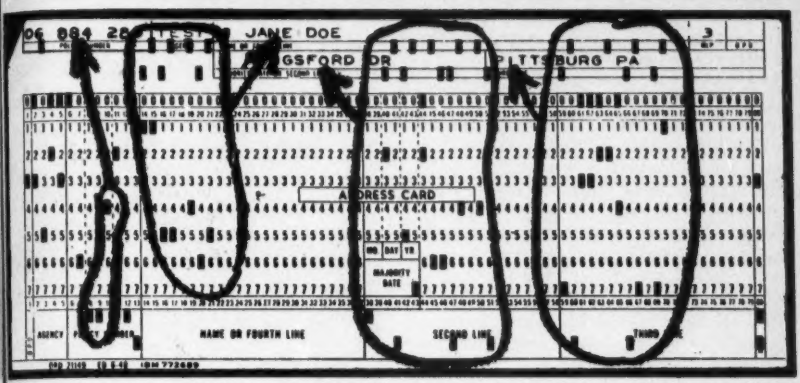


HOLES ARE THE LANGUAGE of punched cards used in business machines. The circled punches represent the number and words indicated. Cards have done much to help . . .

Machines Revolutionize Office

As production grows paperwork grows too. Business machines can do this work faster, more accurately, and at lower cost than humans

BUSINESS MACHINES have played as important part in the industrialization of the world as have automatic production machines. As industry has grown its volume of paper work has grown also.

Today, it is impossible for a highly skilled bookkeeper working with a pen to compete with a high-school-trained girl operating a business machine. The old fashioned bookkeeper cannot handle the volume of paper work required by our ever-increasing production.

The "industrial revolution" in the office means three things:

1. Business (even little business) can operate more efficiently.

2. Mechanization of office work is only on the threshold of almost unbelievable advances.

3. It has created a gigantic industrial business—the manufacture of machines.

Business (office) machines today are the machine tools of management. They are the same to the office force as the lathe is to the machine shop or the assembly line to the automobile industry. Personnel records, inventory checks, production planning, plant layout, marketing research, and hundreds of other jobs are being handled by office machines. Only by machines can the required volume be handled fast enough and with the required accuracy.

Personnel jobs, such as social security, wages and hours, withholding taxes, hospitalization, employee saving plans, and union dues, make the machines a necessity. Full employment makes them even more so.

No longer is it possible to hire highly trained personnel for the more menial office jobs. Today, regardless of ability, the office worker demands an income far above prewar demands. And in the office as well as in the plant, productivity is low. Machines help offset this.

The variety of office machines available is almost unlimited. So are their savings. They can save space, time, money, effort.

Microfilming equipment can reduce

files of records to a small fraction of their former space. The electric typewriter takes only a fraction of the effort to operate as does a mechanical one. This lessens fatigue, increases efficiency and accuracy. Dictating machines gives the secretary more time for other jobs. Calculating machines will do in seconds the same computations it would take a human so long to do that the result would be obsolete on completion.

Governments are big users of business machines. Their jobs are the biggest. In the Baltimore office of the U. S. Social Security Administration, records are kept on 92.3-million separate accounts. At least eight or nine records are kept for each account. The job is possible only because business machines are used. About 750,000 accounts are processed daily by the machines. One operator handles 4,600 accounts daily.

Punching machines permit an operator to translate 2,700 employee wage items into punch-card (see previous page) information daily. This is the slowest of all machines used since it is manually operated. Sorters can arrange these punched cards into any desired sequence at the rate of 450 cards per min. Tabulators give the desired totals from 150 cards per min. Collators can compare punchings on one card with other cards, interfile or distribute cards into matched pockets, reject cards containing errors.

MICROFILMING will reduce filing space to a fraction record take.

BOOKKEEPERS cannot compete with girls operating machines.

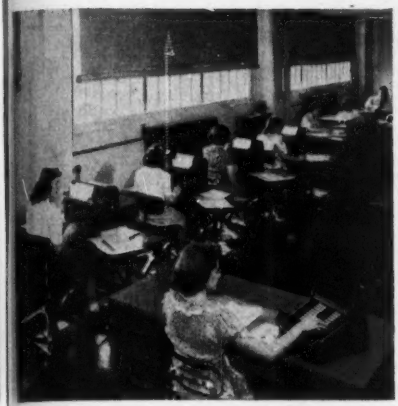
All 93-million original application are recorded on microfilm. Film occupies 250 filing cabinets. Forms would fill 20,000 similar cabinets.

The Social Security Administration (which rents the equipment from the manufacturer at $25 to 600 per month) estimates it costs only 13¢ per account per year to maintain these records.

The punched card is a standard tool of big business. With it management can keep complete data for a product, type of material, or department on a single card. Although the data are recorded as punched holes, the machines can arrange the information in any desired sequence or way. The information is "read" from the card by brushes making electrical contact through the holes.

Small business, too, can obtain the advantages of business machines. Small, less complex machines are available which will do almost as much as the larger machines yet cost much less.

One business-machine manufacturer



EQUIPPED with business machine, this office is efficient.

sells "packaged payroll" plans to companies employing 100 or so persons. The service bureau punches three cards for each employee—earnings card, deduction card, and summary earnings card. At the end of each pay period, the employer furnishes the bureau the hours worked by each employee. The machines determine worker's pay. The service costs $8.25 per payroll.

Trend toward office mechanization has been opposed by some, as has industrial mechanization, because of the danger of throwing people out of work. But again as in industry, the reverse has happened.

Office employment in the U. S. has grown rapidly since the 1870's when office equipment first became popular. It has risen at a rate faster than any other type of employment. This phenomenal rise in employment also mirrors the tremendous increase in paperwork now necessary in industry.

Today, office machines are in a sense mechanical brains. Given the right information they select, compare, show judgment, figure problems, give correct answers. They do all this with a speed and efficiency that makes the human mind seem slow and inefficient. But tomorrow, the machines will do even more as the machines turn from mechanical machines to electronic machines.

The first of these electronic machines —Eniac (Electronic Numerical Integrator and Calculator)—was built for the Army to figure artillery tables. Another electronic calculator, now operating at Harvard University, is a 12,500-tube, 20,000-relay machine capable of handling 250 times the capacity of Eniac. The machine has memory tubes capable of retaining 160 decimal digits. It does 3,500 additions or subtractions per second.

Still in the design stage is Univac (Universal Automatic Computer), a small office-sized Eniac. The machine will have a high-speed memory of 12,000 decimal digits, doing almost a million additions or subtractions per second. A million decimal digits or facts can be held on a metal tape reel.

The machine will be completely electronic. It will not be as complicated as Eniac, having only 2,000 tubes. It will handle the alphabet, in both capitals and small letters, as well as numerals. It should sell for about $200,000.—Business Wk, May 28, p65

PUNCHED CARDS can be assembled into any sequence by this sorter.

How To Cut Costs . . . . . In Tanning

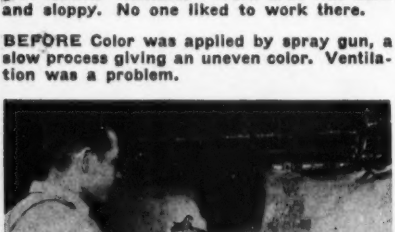
BEFORE Wheelbarrows and work table were the equipment in dehairing area. Area was dirty and poorly lighted.

AFTER Pallet-handling lift trucks have replaced wheelbarrows. Hides are on pallets. Area is clean, well lighted.

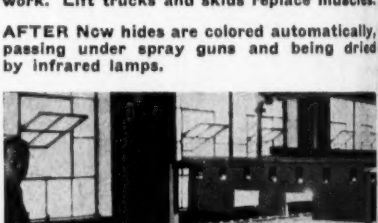
BEFORE Hides were soaked in lime vats to give leather "texture." Work area was dark and sloppy. No one liked to work there.

AFTER Lime-soaking area has been cleaned up. Workers have ample room in which to work. Lift trucks and skids replace muscles.

BEFORE Color was applied by spray gun, a slow process giving an uneven color. Ventilation was a problem.



AFTER Now hides are colored automatically, passing under spray guns and being dried by infrared lamps.



BEFORE Hides were dried on boards. They were laid on boards, held in heavy frames, and hand-hauled to drying area.

AFTER Drying is now done on conveyors, hides being hung on glass frames. Monorail runs through an over-drier.

Workers' Ideas Clean Up Tannery

Suggestions by employees help tannery to clean up and modernize plant. Production or sales were not interrupted during changeover

WORKER'S IDEAS should not be overlooked by management when planning new production methods or plant layout. Who knows better how to simplify a job—especially a manual labor job—and how to cut costs through making that job simpler to perform than the man now performing that job?

The Fred Rueping Leather Co. used this method to remodel its tannery operation—an industry long reputed to be a dirty and unpleasant one. The plant's 200 employees made suggestions as to how production could be improved through relayout of machinery or installation of new equipment. One employee made models of the equipment in his home workshop, and the proposed layouts were set up with them.

The old five story layout was abandoned in favor of a two-story layout. Old construction was torn down and departments were rerouted as new construction was completed. There was no interruption in production.

Now hides and other raw materials are received at one end of the plant in a train shed holding six freight cars. Raw materials proceed across the first floor of the plant and back across the second. Lift trucks, monorails, and a single elevator handle materials where workers' muscles served previously. Extensive use of glass-block windows and higher ceilings have added to worker comfort.

It has paid off in three ways:

1. Production was not interrupted; sales were not reduced during the changeover which took just over 1 year.

2. Plant space has been saved. Aisles have been widened. Production space has dropped from 400,000 to 300,000 sq. ft.

3. Labor force can be cut 25%.

This last will not be done immediately. The reduction in working force will be done through normal retirements.

Before the modernization, Rueping had trouble keeping its labor force up to the necessary level. Now, with better worker surroundings and less back-breaking work, labor recruiting is no problem.—Business Wk, June 11, p64

Point Four Sent to Congress

Plan calls for emphasis on technical assistance. World and Export-Import Bank funds will augment U. S.-U. N. contributions

PRESIDENT TRUMAN'S "bold new program" for the development of the world's under-developed countries has been reduced to legislation for consideration of Congress. As presented to Congress for acceptance, much of the "bold" look, as prescribed by the President in his inauguration speech, has been lost. Rather, the legislation calls for a program of cautious experimentation.

Total funds requested from Congress by the President are only $45-million. This would finance the government's program of technical assistance to underdeveloped countries; one-third would go to United Nations agencies, and the remainder would be spent by the United States.

To raise the living standards of the world's peoples will cost much more. It will require immense amounts of technical skills and capital. The main source of capital will be the under-developed countries themselves.

Three Aid Sources

Aid will be provided in three ways—the World Bank, the U. S. Export-Import Bank, and private U. S. investors. The last is the most important of the three. It is the best—most positive—assistance the U. S. can offer. But it will be the most difficult to obtain. Poor foreign "business climates" act as a deterent to private U. S. investment abroad.

To overcome this the U. S. government will guarantee investments abroad, modify tax laws covering income from overseas investments, negotiate new treaties with countries seeking U S. investment capital.

About $100-million will be spent during the coming year on technical assistance phase of the program. About 35% will be provided by the countries themselves. The remainder will be U. S. and United Nations contributions.

Agricultural development, flood control, disease elimination, power development will get the biggest share of technical assistance the first year. But help will be provided in other fields as well.

$1.2-1.6-Billion for Investment

About $1,200- to 1,600-million yearly is expected to be available for U. S. investments abroad. About $600- to 700-million would come from the World Bank and the Export-Import Bank. The rest would be private capital.

The U. S. government favors, but potential borrowing countries oppose, private capital participation. Large development projects will undoubtedly be done with government funds.

Currently the Ex-Im Bank has available $930-million for lending. This will be raised $370-million in the next three years by repayments to the Bank. The President may ask Congress to appropriate an additional $500-million for the Bank. Another request may be made for additional funds to cover U. S. private investments abroad. The government would like to see the Bank lending between $300- and 400-million annually to augment "point four".

Must Remove Bad Climates

The poor foreign "business climates" mentioned earlier must be removed if business is to get behind the President's "bold new program" in earnest. Private capital is pressing the government for their removal.

As to guarantees of U. S. capital invested, the government and private capital disagree. It is a departure from previous relationship between government and business in this couuntry. Guaran-

tees will really put the government in business. Industry does not like this aspect of guarantees. Yet industry is not willing to make the investments without some assurance that their investment will earn them a profit that they may take out of the foreign country. And that their investments will not, at some future date, be confiscated.

Technical assistance and financial assistance abroad are certain to be a part of U. S. foreign policy for some years to come. The program will accomplish little in its first year. But it is a start. World business can count on the President's "fourth point" to be a factor in world business of the future.—*From a Special Report by the editor of McGraw-Hill American Letter.*

Australian Plant Investment

Industrial spending in Australia will not decline substantially the second half of this year. Manufacturers plan to spend 26-million on equipment and building, about equal to the amount spent in the second half of 1948. Three-quarters will be spent on new equipment.

About £9-million will go for new plant and equipment in the metal-working and vehicle industries. Expenditure in the electrical power field is expected to stay high for many years. Manufacturing industries and utilities, in recent years, have accounted for two-thirds of total capital investments; that proportion is now increasing.—Mach, Apr 30, p37

Coating Prevents Corrosion

Corrosion inhibition by application of latex coatings impregnated with sodium benzoate has been under investigation in England. Wrapping materials made this way not only exclude humid or polluted atmospheres, but also prevent attack on the underlying metal if the wrapping is defective.

First wrappings developed were cellulosic materials. More recently, rubber latex was tried with success. Dipping or spraying produces a satisfactory coating.—Prod Eng, June, p175

How To Cut Costs

A Reminder About Next Month

The September issue will bring you that promised "Report to Management" on design for lower cost. Here are a few of the cost-cutting hints we have planned for you:

- **How to meet the material-cost problem.**
- **How to design for quick, easy assembly.**
- **How to design lower costs into parts and assemblies.**
- **How to benefit from cost elements of surface finishes.**
- **How to design savings into products by standardization.**

And remember too the coming January 1950 issue—a 24-page roundup on cost-cutting ideas covering all branches of industry. And intervening months will bring you other important articles on the same vital subject.

This month, see page 24 and page 40.

How to Cut Diesel Costs by Smart Operation Kinks

Better economy in operation of diesel power plants can be realized by smarter application and fuller exploitation of diesel-engine advantages. Thus, where substantial amounts of heat can be used for process or space heating, double use can be made of fuel's heat content, as from engine waste heat in hot jacket water or hot exhaust gas.

Diesel engines also offer possibilities in combination with steam. This type of plant—diesels with steam engines or turbines—fits where heat requirements are so large relative to power load that they are not obtainable from diesel waste heat. Steam prime movers are loaded only to the extent that their exhaust can be profitably utilized.

Another possibility is for direct diesel drive of large loads, such as refrigerating compressors in ice plants and air-conditioning installations. This arrangement can cut operating costs and, at the same time, provide speed flexibility.

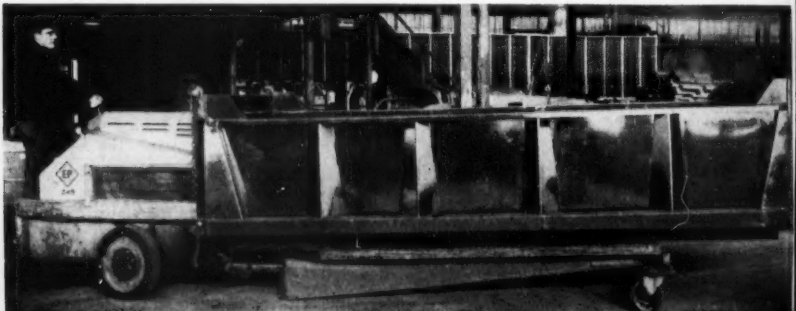
Dual-fuel engines offer many more chances for profitable diesel use. Sewage-disposal plants are examples. Other opportunities offered by diesels include power for isolated plants, applications where dc. is desirable and where diesel drive avoids investment in ac.-dc. equipment, and firming-up hydro capacity.—Power, June, p97

Largest Soybean-Glue Plant

New Monsanto Chemical Co. plant in Seattle cost more than $1-million and is the biggest soybean-glue operation in the world. Raw soybean meal is blended, passed over a magnetic separator, and fed to five hammer mills.

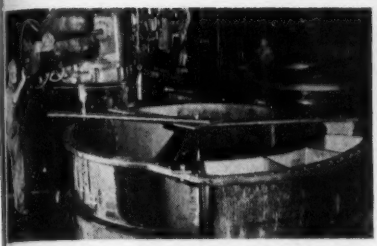
The mills, each of 1,750-lb. capacity, reduce the meal from 80-100 mesh to 200 mesh. Fans blow the meal to five gyratory sifters. Flour from the sifters goes to surge bins, then to a horizontal ribbon pre-mixer containing sodium salts and other alkaline chemicals. Defoaming liquids and petroleum solvents are added.

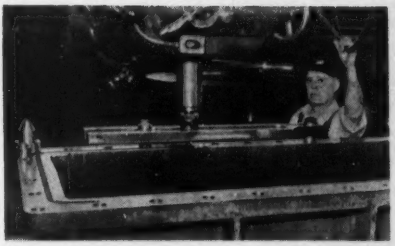
After 20 min. of mixing, the material is conveyed to a concentrate tank, fed to a second mixer, and mixed with more flour. After two more mixings, the dry glue is passed through a gyratory scalper for removal of any foreign matter and is then bagged.—Chem Eng, May, pPPI-45



HOW TO HANDLE LONG, BULKY BODIES

Long, bulky, and heavy objects, such as this dump truck body, can be moved by industrial trucks. An Elwell-Parker low-lift platform truck combines with a two-wheeled dolly to transport the long body.—Steel, May 23, p98





SPIDER AND CAM GUIDE GROOVING CUTTER

At least 1,000 man-hours were saved by method developed at Westinghouse Sunnydale works to machine ¾-in. wide V-grooves in faces of conduit sections of Shasta Dam outlet gates. Grooves, needed to receive neoprene gaskets to seal joints, were cut by radial drill working V-shaped cutter. Radius cuts were controlled by inserting cutting head through holes in a swinging arm centered by a removable spider bolted to casting flanges. Straight and slightly curved grooves in conduits and bonnets were cut with guide plates guiding the cutting head.—Am Mach, June 2, p93

Ozone Purification System Treats City Water Supply

About 70-million gal. of water per day will be ozone-treated and 200 kw. hr. per million gal. will be needed when Philadelphia's Belmont pumping station has its complete ozone water-purification installation in operation.

Incoming air is cleaned in electrostatic precipitators, cooled to about 48°F., and dried in four dehumidifiers of 1,000-cfm. capacity. Activated alumina is the absorbing medium in the dryers. Moisture is reduced to 1 gr. per lb.

The air is passed to 50 ozone generators. Each generator is built something like a fire-tube boiler. In each tube, a Pyrex glass tube is centered with spacer blocks. The inside of the glass is coated with graphite covered with a protective enamel. This graphite acts as one electrode and the steel tube as the other.

Potential of 15,000 volts is applied. Corona discharge between glass and metal ozonizes the air passing from one header to another. Ozonated air (O_3) flows to diffusion tanks for water purification.

Treated air is diffused through porous plates at bottom of tank and rises through the water. Water is treated for 10 min. Present equipment can handle 36-million gal. daily.—Elec World, June 4, p104

World-Wide Oil Developments

Brazilian government has approved construction of a 6,000-bbl.-per-day oil-shale plant. Foster Wheeler Corp. will build it for Cia. Nacional de Minerais Oleo.

Sinclair Petroleum Co. in May spudded the first oil well ever drilled in Ethiopia. The start of drilling operations was preceded by 3 years of exploration. Well location is in the semi-desert Ogaden area.

Largest oil field in Western Europe is at Schoonebeck, Holland. Its present production of 11,300 bbl. daily is a substantial part of Western Europe's indigenous output.

It is reported that Turkey is attempting to obtain foreign capital to proceed with its oil development plans, particularly at Raman Dag. Detailed and official data on the field is lacking, but it is credited with a production of 2,000 bbl. daily from 12 wells.—Oil & Gas J, May 19, p172, 173; May 26, p157; June 2, p112

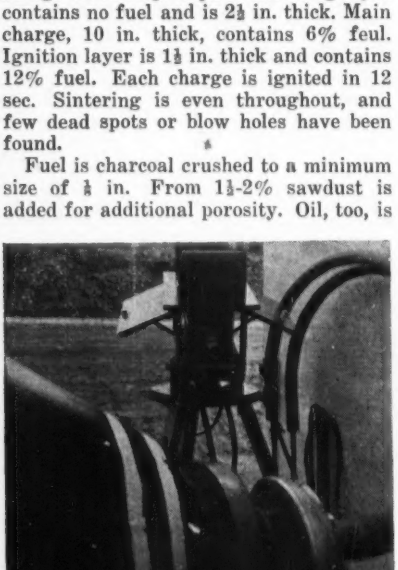
Crush, Screen, Sinter Ore To Increase Iron Output

Crushing, screening, and sintering facilities at the Minas Gerais plant of Belgo-Mineira have raised output of iron ore. The 60% ore is crushed to 1-in. size and screened. Minus ¼ in. fines are stored in bins. Crushing and screening plant handles 100 tons of ore per hr.

Sintering is by Greenawalt process using two 150-sq. ft. pans. Bedding layer contains no fuel and is 2½ in. thick. Main charge, 10 in. thick, contains 6% feul. Ignition layer is 1½ in. thick and contains 12% fuel. Each charge is ignited in 12 sec. Sintering is even throughout, and few dead spots or blow holes have been found.

Fuel is charcoal crushed to a minimum size of ¼ in. From 1½-2% sawdust is added for additional porosity. Oil, too, is added. Consumption is about ½ gal. per ton of finished sinter.

After cooling, sinter is screened. All sinter above ¼ in. goes directly to the blast furnace. Minus ¼-in. material is added to the mix. Return fines run about 35%. The finished sinter is low in silica, soft, and not too fragile—Eng & Min J, June, p59



TELEVISE DANGEROUS JOB

Ordnance engineers can now defuse and disassemble explosive bombs from behind a barricade. Tools are manipulated by remote control, while operation is watched by television. This setup shows a Remington Rand "Vericon" industrial television camera from which signal is carried by coaxial cable to viewing screen.—Electronics, June, p133

Potato-Starch Processing

New methods of making potato starch lower production costs and diversify products to make better use of raw materials. Poorer grades of potatoes are made into starch, while better grades are used for potato chips, flour, or dehydrated potatoes.

Potatoes are ground, washed thoroughly, and fed to hammer mill or disintegrator. Mash is pumped through two starch separators. Pulp is screened and passes to collection area for disposal.

Milk starch passes through shakers, a centrifuge, another set of shakers, then to starch-removal vats. Here SO_2 is added, and the brown starch allowed to settle out and tabled. Remaining starch is mixed with water, filtered, dried, and bagged for shipment.—Chem Eng, June, p120

Flash-Weld African Rails

More than 1600 mi. of welded railroad rails have been laid by South African Railways. Present method is to make up 120-ft. lengths of three 40-ft. lengths.

Shorter rails are flash-welded together in the shop, then moved out on the line. The 120-ft. length has been made standard because it is the longest rail that can be transported around curves of 300-ft radius on 3½-ft. track.

Rails are transported in two 60-ft trucks coupled together. A type of bolster is pivoted on two points of the trucks, allowing rails to move transversely when trucks round the curves.—Weld Eng, June, p23

Low-Temperature Coking Plant

Attempts to carbonize coal at low temperatures have failed many times, but now a new one is getting a $3-million trial

ARBONIZATION of coal is now being carried on at low temperatures in the new Disco Co. plant near Pittsburgh. The plant, costing $3-million, is the result of more than 20 years of research.

The solid fuel produced, which is marketed under the trade name Disco, consists of balls of lightly carbonized material. It affords smokeless fuel service in house heating and in small furnaces.

Byproduct recovery provides a liquid tar that is refined to produce tar acid oil, tar acids, creosote, fuel pitch, and pitch coke. Gas given off during coking is used to fire the retort after removal of crude liquid products.

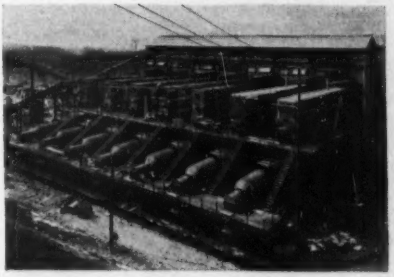
The process begins with wet coal and includes these steps: (1) predrying, (2) roasting, (3) carbonizing, (4) cooling, and (5) screening and loading.

Moisture content is lowered to 2-3% in three flash dryers heated by hot gas from coal-fired furnace. Next, in the roasting process, coal is preheated and partially oxidized by exposure to controled quantities of air in six-pass rectangular hearth roasters heated by circulating flue gas.

Preheating and roasting control the excessive coking characteristics of the high-grade bituminous coal. This step is vital. Close regulation secures uniform size and strength.

Carbonizing retorts are rotating cylindrical shells, 9 ft. in dia. and 126 ft. long, mounted with a slight slope inside stationary cylinders. Heating is from the outside by flue gas in the space between the shells.

The coal from the roasters drops into a screw feed to retorts and is soon heated to plastic temperature. Balls then begin to form, rolling along the shell toward the lower discharge end, the temperature of which is held to 1,050° F.



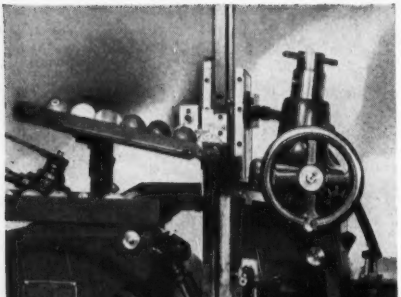
ROASTERS and retorts are principal equipment items around which the low-temperature carbonizing process has been built. Daily capacity is 800 tons from 1,000 tons of bituminous fines.

The solid coke passes to a rotary grizzly screen from which oversize pieces go to a roll crusher. Coke is screened to three sizes. Large size (6x2in.) is air-cooled in a cooling bed, middle size (1-2 in.) is cooled by water spray, and small size (under 1 in.) is added to the cooled fuel. Fines are returned to roasters.

The new system meets four objectives. (1) It upgrades cleaned coal fines. (2) It prepares a smokeless lump fuel of uniform performance. (3) It provides a fuel easily ignited. (4) It allows recovery of a high yield of byproducts without which the process would not be profitable.—Chem Eng, June, p112

Vacuum Moves Glass Stocks

McKee Glass Co. has installed a vacuum-handling system for unloading raw materials from cars. System delivers batch to storage bins. It also gathers, mixes, and delivers material to tanks. Mixed batch can be delivered any distance without segregation.—Ceramic Ind, June, p86



FEEDS BILLIARD BALLS

Plastic billiard balls are trued in a Cincinnati centerless grinder equipped with ball carrier. Formed like bottomless cup, carrier works in vertical slot. It lowers new ball from top tray to work blade, drops over blade during grinding, then lifts finished ball to lower tray where it tips to unload ball into chute.—Am Mach, May 5, p95

Timbering Machine Cuts Crew

Labor costs for timbering and the accompanying personal hazard have been cut 50% at Consolidated Coal Co. since adoption of Baker-Raulang Co. timbering machines and shop-built semi-trailers to haul timbers. Eighteen machines are in use. A crew of three men can timber 13-25 working places (yielding 450-900 tons) per shift. Manually it took six men to timber for each loading crew.

Semi-trailer carries 18 crossbars 14 ft. long and 26 posts 8 ft. long, enough for a half shift. Manual handling is limited to sliding timbers from trailer to saddle on boom. Boom can be moved 30 in. forward or backward by hydraulic control, eliminating tramming.—Coal Age, June, p80

Compound, Extrude Plastics In a Single Operation

Compounding of virgin resins, fillers, colorants, plasticizers, and other components for proper plastic formulation will be speeded greatly with Welding Engineers Inc.'s compounding extruding machine. Massive set-ups for preblending, mixing, milling, compounding, calendering, etc. will be unnecessary.

Basically the machine is an extruder using two worms. Design of worms makes thorough compounding possible. First section of unit is feeding and compounding section, second is for secondary compounding, and third for extruding.

Worms rotate inside the compounding sections, the walls of which are machined to a figure-eight shape. At the extrusion end, the figure-eight shape streamlines into a conventional single-opening extrusion chamber.—Mod Plastics, June, p89

Tester Aids OCB Maintenance

Condition of oil-circuit-breaker contacts can now be determined without dismantling the breaker. The device used is a conductivity tester which measures contact resistance at load current ratings by the voltage-drop method.

The portable tester consists of a small, center-tapped transformer with selenium rectifiers in the low-voltage secondary. It produces 200-amp. dc. output. Direct current is used because the iron in current transformers in the breaker prevents accurate measurements with ac.

Defects that can be detected by the tester include: (1) loose screws in shunt straps at bushing-cap terminals; (2) loose flanges in interrupting chamber; (3) loose bolts in contact fingers; (4) high-resistance connections because of oxide formation on contacts, electrolytic action, or varnish between contact surfaces; (5) eroded and burned contacts.—Elec World, June 4, p83

Alloy Strip Hot-Coiled During Reversing Passes

Midland Works of Crucible Steel Corp. now has in operation the first complete hot- and cold-rolled sheet and strip mill facilities designed throughout for production of stainless and special alloy steels.

Heart of the installation is a 66-in. 4-high reversing hot mill built by United Engrg. & Foundry Co. It utilizes drum-type coilers housed in gas-fired furnaces at each side.

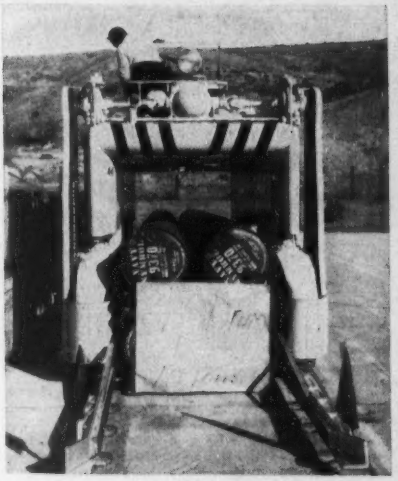
As tooled, the mill can roll strips from 1 to 0.076 in. in thickness and widths from 15 to 50 in. The temperature control afforded by furnaces at each side of the mill will allow rolling to wider and thinner strip dimensions.

Work rolls are 27 in. in dia and are direct-driven by 5,000-hp. motors. Back-up rolls are 48 in in. dia. The mill can roll 1,200 fpm., five passes ordinarily being sufficient to attain the finish gage.

The Dun-Mar hot reel furnaces are driven by 150-hp. motors. When strip passes through the rolls, the reel receives the strip end and starts coiling automatically. Small pinch rolls, between mill and furnaces, control strip travel and feed strip back and forth.—Steel, May 23, p94

Leadscrew Checked by Photo

British National Physical Laboratory recently showed, in experimental form, a photographic method of checking the accuracy of a lathe leadscrew. Variations in the linear movement of the saddle relative to rotation of headstock spindle were indicated by inequalities in the spacing of a series of lines recorded on the photographic plate. Lines were recorded by focusing the camera, mounted on the carriage, onto a horizontal glass scale secured to the bed and exposing every revolution as a high-speed flash unit operated.—Mach, June 4, p223



SHOES RAISE TRUCK CAPACITY

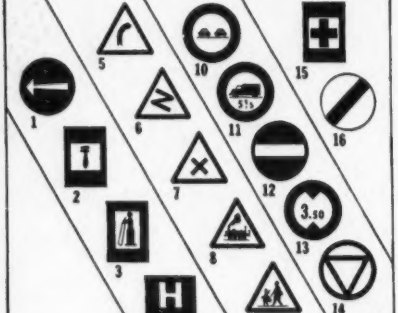
Addition of extension shoes to this straddle truck greatly increased its load-carrying capacity. The U. S. Navy developed the shoes. One truck, so equipped, is moving 100 tons per hr. over a 1½-mi. haul. At another installation, 48x72-in. pallets, holding 40 filled oil drums, are being handled. 60 drums later. —Factory, June, p106

Continuous Process for Jelly

Jams and jellies are still being made by batch operations. Quality has been improved, yields have been increased, costs have been lowered by modern equipment.

But the batch method may be replaced by continuous processing. The Reich process is claimed to be capable of 120,000 lb. per day with less labor and higher product quality than can be obtained by batch operation.

In this method, ingredients are automatically proportioned from tanks into a preheater, mixed, and dissolved. The mix is partially evaporated, reheated to 190° F., and held at that temperature to attain desired sugar inversion. Filling, capping, and cooling are done in the usual way.—Food Ind, June, p67



INTERNATIONAL ROAD MARKERS

These international road signs and traffic rules and regulations are scheduled for discussion at the United Nations-sponsored Geneva Road Conference this month. Symbols mean: (1) this way, (2) service station near, (3) gasoline station near, (4) hospital—quiet, (5) right curve, (6) dangerous curve ahead, (7) intersection, fork, or junction, (8) unprotected railroad crossing, (9) school, (10) do not pass, (11) no commercial vehicles, (12) one way street, (13) maximum vertical clearance, (14) stop, (15) first aid station, (16) end of speed zone.—Am Auto, July, p42

New Grinder Cam-Controlled

A prototype of a new Bryant internal automatic grinding machine is stripped of all hydraulic and electronic control devices. This may mark a return to simpler maintenance.

All elements in the machine are cam-operated, the only electrical devices being limit switches, solenoid brakes, and three motors. Low-speed cam operation avoids cam clank, so the machine is relatively quiet.

This first machine is designed to rough-grind and finish a 1-in. hole in an automotive bearing cap to ± 0.0002 in. and to face the inside end. Four-part cycle takes 12 sec. Wheel dressing is automatic before finish-grinding, and wheel wear is compensated for automatically.—Am Mach, June 2, p105

Full-Strength Chemicals Now Used in Saturators

Feeding of raw full-strength chemicals into saturators is a development brought on by the use of continuous bleaching systems. Feeding is through diaphragm or piston proportioning pumps. These pumps eliminate possibility of deterioration of the chemicals and save time, labor, and space.

Pump settings are regulated to feed the necessary amount of liquid chemicals per min. according to the pounds of cloth passing through the saturator. Pumps (flowrators or rotometers) are supplied from 30-60 gal. storage tanks, usually mounted above the saturator.

Removal of residual chemicals and impurities from the cloth after alkali or peroxide steaming is unnecessary. White goods treated in a caustic soda J-box must be cleaned before it enters the peroxide saturator.

• Cloth processed through continuous ranges or kiers may be scoured with the same amount of alkali. Ratio of cloth will be about four or five to one against one to one in continuous bleach steaming operations.

For ranges of J-box capacities up to 300 yd. per min. or more, tight stand washers are being used.—Textile World, June, p108

Welded Gear Box from Plate

Gear box for a double-reduction locomotive drive transmission is now welded instead of cast at General Electric's Erie works. Production costs have been lowered, and weight has been cut from 705 to 600 lb. The same machining tools are used for the welded box that were used for the cast steel one.

Parts are burned from steel plates from $\frac{3}{4}$ to 6 in. thick. Through nesting of parts, considerable steel is saved. After welding, assembly is annealed at 925° C.—Railway Mech Eng, June, p339

New Applications Found for Magnetized Iron-Oil Mixture

Development of the magnetic-fluid clutch by U. S. National Bureau of Standards (McG-H Digest, June '48, p13) has resulted in many industrial uses for the fluid itself. This fluid, composed of iron particles suspended in oil, can be changed from a liquid to a near solid by establishing a magnetic field.

One application is in shock absorbers and other forms of dash pots where piston motion is controlled by liquid viscosity. No moving parts except the piston are required. Complete control is afforded by changing current in a magnetic coil located in the device.

The fluid also can be employed in certain molding processes where an impression is taken by the material in a semiplastic state. A casting mixture is poured into the mold, which is then released by opening a switch.

Another interesting application is its use as a controllable holding means. For instance, in a ball-and-socket joint, the material can surround the ball. By controlling material stiffness and its adhesion to iron surfaces, the ball can be freed or locked by adjusting a rheostat.

Investigations on characteristics of oil, particle size, and particle material have resulted in a number of improvements. Continuing experimentation is expected to open up more uses.—Prod Eng, June, p171

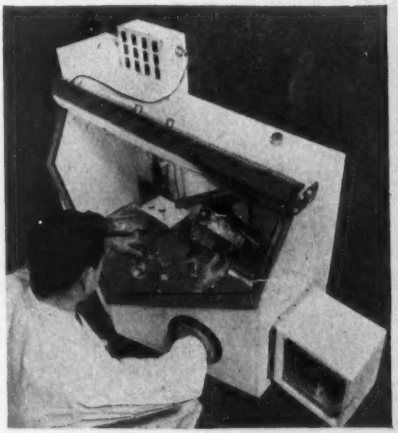
Concrete, Steel, Glass Panels

Prefabricated exterior building panels of concrete, steel, and glass insulation are being manufactured by Pittsburgh Corning Co. Final installation costs, the company claims, run $2 per sq. ft. less than other exterior facings. Panels are fireproof. They will withstand 3 to 4 times expected wind velocities, yet they weigh only one-third as much as masonry walls.

Box-like casting the exact size and shape of the finished panel is first set up. Concrete veneer is poured in and a welded-steel-mesh reinforcing placed. Then cellular-glass insulation layer is inserted. A second layer of the reinforcing and cement veneer is laid against the opposite face. Panels take 24 hr. to set.—Business Wk, May 14, p84

Affects Steel Hardenability

Research by U. S. National Bureau of Standards indicates that the action of boron in increasing the hardenability of steel is due to a solid-solution effect at heat-treating temperatures. Boron undissolved or in form of compounds either has no effect or possibily decreases hardenability by acting as transformation centers for austenite in the temperature range where pearlite is formed. It also decreases the nucleation rate but not the rate of growth of ferrite and carbide.—Steel, June 6, p105



GLOVE-BOXED LABORATORY

Handling radioactive materials is made safer by Scientific Service, Inc.'s new miniature laboratory. Ports allow the operator to work in special gloves that protect his hands. Slight vacuum inside the plywood box limits spread of contamination.—Nucleonics, June, p84

Progress Report on Status of Nodular Gray Iron

The whole development of nodular iron is in a condition of rapid change. But there is no question that development of nodular, or spheroidal, graphite will have far-reaching effects on the gray-iron industry.

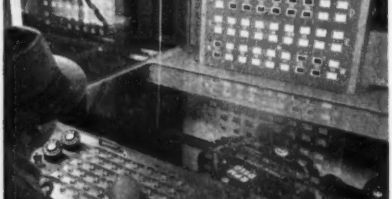
The British Cast Iron Research Association last year announced a workable process by use of cerium as the nodulizing agent. International Nickel Co. then indicated similar results using magnesium. Prof. De Sy, Belgium, has had some success with lithium.

Two conditions for converting flake graphite to nodular form are a low sulphur content and use of a ladle inoculant to prevent nodular irons solidifying in a mottled or white condition.

Yield points of these irons vary from 54,000 to 70,000 psi., and ultimate strengths from 71,000 to 94,000 psi. Modulus of rupture is up to 24-million, and elongation to 12% after 1 hr. 1400°F. Nodular iron is more amenab to hot working than normal gray irons.

The magnesium treatment appears have one decided advantage over use cerium. It may be possible to treat low carbon-equivalent irons and high sulphur irons than can be done succe fully with cerium. But the phosphor content should be as low as possible realize the full strength and ductility the nodulizing process.

Possible future applications are numerable when nodular iron is produc on a commercial scale. Suggested uses clude all types of machinery, engi parts, wheels, and similar items. Foundary, May, p112



CONVEYING SYSTEM CONTROL

New package and grease plant of Standard Oil Co. of Calif. has a mile of roller conveyors in basement. Heavy drums are switched by electronic control from this booth. System checks each barrel past one point and permits assembling of orders at proper locations for loading.—Oil & Gas J, May 26, p95

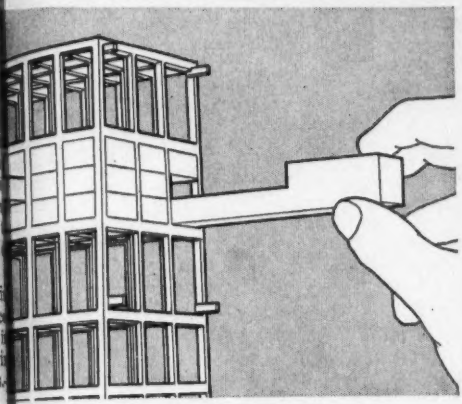
Raises Beer-Canning Rate

New filling and closing unit for be cans, which was made by Continent Can Co., has enabled a New York bre ery to step up production materially. is driven by a General Electric Tri-Cl type ACA adjustable-speed motor, whi permits the brewer to vary his output cans from 105 to 315 per min. in a cordance with production demands.

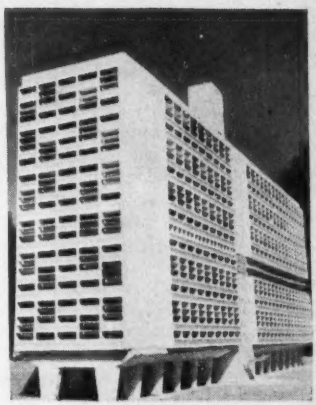
An air cylinder, acting in conjunct with a hydraulic clutch, provides a bra ing system that stops production in t can-widths. The line can be halted fr maximum speed to a complete stop ½ sec. This saves cans and beer in ca of a jam.—Elec C&M, June, p70

Cuts Lock Installation Time

By packaging its pre-assembled tubul lock in sectionalized box in "explode position, Yale & Towne Mfg. Co. clai the lock can be installed in 30 sec. Co plicated installation diagrams are elim nated as carpenter sees at a glance h lock should be installed. On large co struction jobs, such as hospitals, hote and office buildings, total installati time saved would be considerable.—M Packaging, June, p116



DRAWER-LIKE, prefabricated apartments . . .



FORM this apartment as . . .

France Builds An Apartment City

Prefabricated apartments, in three sizes, fit into building like drawers in a filing cabinet. Population will be locally self-sufficient

"VERTICAL CITY," now under construction Marseilles, is the realization of an old eam of architect Le Corbusier. The -story, $1,000,000 apartment building—city in itself—is really an enlargement the filing-cabinet principle. Prefabri-ted apartment units will be inserted in Corbusier's novel framework.

Built to house 1,800 persons, the 334 partments will provide occupants with their necessities—shelter, food, cloth-g, recreation, education, and hospital-ation. The seventh and eighth floors ll be a shopping center.

Resting on 36 tapered, hollow concrete ers, the building is 26 ft. above the round. It occupies only 10% of the 7.2-re plot of ground. Remainder of the ea will be park.

Building is 450 ft. long, 71 ft. wide, d 184 ft. high. Oriented north and uth, all apartments will have direct nlight.

First floor—resting on the 36 piers—a 9½-ft. thick reinforced concrete mat supporting the 16-story skeleton of hollow concrete columns and girders. Into this skeleton the soundproof, prefabricated apartments are inserted.

Foundation consists of spread footings to a depth of 30 ft. They support two rows of piers. Concrete girders, cast in pairs monolithic with piers at first-floor level, form transverse rigid frame. Piers are linked in a north-south direction at first-floor by concrete girders supporting a floorbeam at midpoint of each span.

Main frames consist of a column at each face of the building and two interior hollow columns which serve as structural members, plenums for heating and ventilating, and passageways for plumbing and wiring.

At every three stories—where main passageways are located—frames are topped by concrete slabs. They cube the building into fireproof cells, each cell holding two apartments. Upper stories are divided into four equal segments by expansion joints, each being independ-

ently capable of resisting horizontal thrust. This design feature speeded construction.

Exterior facing is precast concrete slabs coated with white gravel. Balconies are precast elements also.

Apartments are structurally independent with no common walls. The three basic units are: a symmetrical T, each side measuring about 27x11x7 ft.; a 33 x 11 x 7-ft. unit; and a unit half as wide as the second but with a 2-story living room. They range from 1–8 rooms.

Heating and ventilating system is carried in the hollow main frame members. Air enters each apartment at the bottom of the glass exterior wall and is exhausted from each room.—Eng News-Rec, June 2, p16

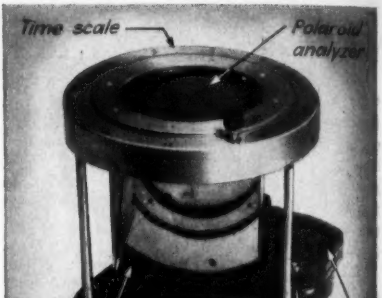
Backsight Aids Survey Crew

A self-illuminating backsight designed by and built in the shops of Anaconda Copper Mining Co. eliminates the third man from underground survey crews. Backsight is a 10-in. long brass cylinder. Bulb is in direct contact with batteries, being screwed into a phosphor-bronze, chrome-plated, 45° reflector. Lucite or Plexiglas head rests against reflector directing light upward to plastic head. Small hole in the center of the head creates the vertical line beneath suspension point.—Eng & Min J, June, p65

Makes Softwoods Hard

Combination of high pressure and temperature in Western Pine Assn.'s new process converts softwoods to woods so hard a nail can not be driven into them. The 1,500-psi. pressure and 325° F. temperature cause the lignin resin to flow and serve as a cementing agent. Process reduces board's thickness about one-third.

Almost any softwood can be processed. White fir has proved best. The association believes the "hard" wood will find applications as flooring, paneling, furniture.—Business Wk, May 28, p32



NAVIGATION problems during twilight in polar regions are now solved by . . .

Non-Magnetic Sky Compass

The magnetic compass in polar regions loses its value as a direction indicator because of weakness and directional variability in the horizontal component of the earth's magnetic field. Another handicap to navigation is the lack of direction reference in the long twilight periods.

U. S. National Bureau of Standards has now developed a compass to solve these problems. It is a non-magnetic sky camera which indicates the direction.

Principle of operation is that light of sky during the day is partially plane polarized, with polarization maximum at right angles to the incident sunbeam. Plane of polarization is determined by a polaroid analyzer on the compass. The instrument also has an azimuth circle on which the sun's computed azimuth can be set and a 24-hr. clock which drives a chosen reference line in synchronization with the sun's apparent motion.—Prod Eng, June, p173

New Yarn Blends Possible With New Fiber—Celcos

Celcos, a new chemical staple fiber developed by Celanese Corp. of America, combines features of acetate and viscose staple fibers to cross dye and to absorb resins and other finishes. Samples of the fabric containing various percentages of the yarn have proved suitable for suiting and dress goods.

A third member of the rayon staple group, the fiber lies roughly midway between acetate and viscose staple fibers. It is crimped in some filament sizes and lengths. It absorbs more moisture than acetate but less than viscose. It is less thermoplastic than acetate staple.

Celcos can be dyed with acetate or cotton dyestuffs. Two-tone effects can be obtained in blends with acetate staple. The cloth is easy to wash, dry clean, and iron. —Textile World, June, p238

Assemble-Yourself Car

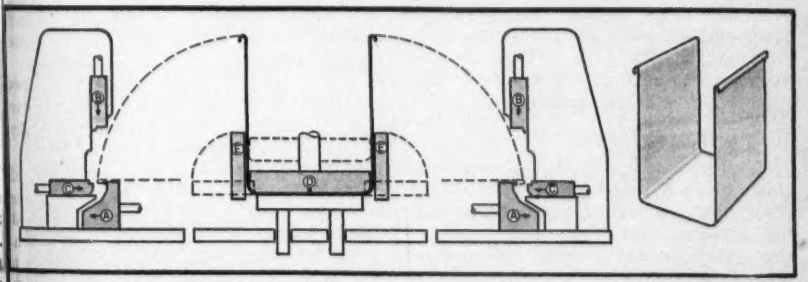
Amateur automobile mechanics will have fun with Kurtis-Kraft Inc.'s new build-it-yourself automobile kit. Kit will include assembly directions; no machining of parts will be necessary. Kit costs about $2800.

Car is 51 in. high, has a 100-in. wheelbase, and is 68 in. high. Body is constructed of fiber glass panels with removable Plexiglas side windows. Kurtis-Kraft assembles the same car in its California assembly plant.—Motor Age, June, p37

Unit Wraps 4x10-ft. Package

Stacks of 4 x 10-ft. insulating wall boards are being packaged at Maizewood Insulation Co. by the "world's largest" package-wrapping machine. Wrapped in 90-lb. kraft paper and glue-sealed, 100 packages are turned out each hour. Previously it took 18 men to handle the volume now handled by four. With modifications to pick up packages as they leave the machine and an automatic loader, crew could be reduced to one man.

The actual wrapping cycle is automatic after the machine has been fed a stack of boards. There are 6-8 sheets to a bundle depending on sheet thickness. A 15% saving in paper has been realized since the more accurate machine works from a narrower roll of paper.—Mod Packaging, June, p129



HIGH-PRODUCTION SELF-OPERATED DIES

First applied to forming of refrigerator cabs, self-operated dies are now employed in complex forming of other sheet-steel parts. To make a typical part, such as the section shown, stock is placed on the table. Slides A, each with forming lip, move outward as slides B move downward to hold stock. Slides C complete the curl. Ram punch D then forces stock downward against cushion-pad pressure to tilt rocking plates E and make corner bends. Dies are used to form dish washers.—Am Mach, June 16, p85

How To Cut Costs

- **Does it make any difference what employees know and think about cost cutting and quality control?**
- **What hurdles does management face in terms of employees, unions, and supervisory attitudes?**
- **What does management have to know before it starts to tell employees about a cost-cutting program?**
- **How do you sell a cost-cutting program?**
- **What are the channels of communication to guarantee best results?**

Tell Why Costs Must Be Cut

Only by close cooperation with your workers can you make your cost-cutting program a success. Bring them into the program fully

MANAGEMENT KNOWS that in the long run cutting costs results in a better competitive position, more sales, more production, more jobs, more stability in jobs, and more continuity of employment. On the other hand, employees and their unions fear the immediate results of cost cutting—a reduction in the number of jobs available through improved and more efficient production methods.

Management's cost-cutting program can be successful only if it has the complete support of the employees.

Does Employee Thinking Matter?

Employees say what they know helps them to do a better, more efficient job. Most workers want to cooperate with management. But many are convinced that management throws away much money through poor planning, lack of planning, or poor judgment.

In a dollars-and-cents-way it makes a tremendous difference whether your employees are with you in your cost-cutting program or not. A few typical employee remarks points this out.

"We put in a new machine, then ripped it apart and sent it away. It probably cost the company $500 to do it. We (the employees) cannot get a raise, yet they (management) waste lots of money by not planning big things."

"We're all in business together. Our pay depends on whether the mill is successful. I'd like to help make it a success."

What Are Management's Hurdles?

Hurdles for management are many at the outset of a cost-cutting program . . . supervisors, workers, union. Employees are always suspicious when management says it wants to cut costs.

"Sometimes I wonder if top management knows just what is going on—what we are doing," says one employee. "I think union-management negotiations have something to do with it. These layoffs are aimed to weaken the union," says another. "Management is not doing a good job of managing. Why should it tell workers to do a better job until it mends its own fences?" ask a union official.

These are typical remarks of the "climate" in which management must work out cost-cutting programs. They show how important it is to get the employees' cooperation—whether it be for cost cutting or any other program on which the company is about to embark.

How Employees Feel?

You cannot talk to your employees about cost cutting unless you know what is in their mind. A worker is interested in himself primarily. This management must realize and take into account. The employee's feeling that "management does not care about people" is the biggest hurdle management faces.

You must make the worker feel he is part of the cost-cutting program. If he is not made to feel he is a part of it, he is not going to be much help in putting the program across.

What Must Management Do?

Specific action by the company will vary from company to company, but seven general principles will apply to all.

1. Find out what employees, including supervisors, are thinking.

2. Appraise and reappraise company policies and practices.

3. Revise basic policies accordingly or create them where they do not exist.

4. Correct those operating procedures that call for immediate action.

5. Teach policies, procedures, and the handling of people to all management levels.

6. Set up a system of free exchange of ideas among employees and union leaders as well as the various levels of management.

7. Tell the plant community the achievements and constructive aims of management.

Basic research studies are often neglected by management out of fear of what the employee really thinks. But trying to change company policy without knowing what is in his mind is impossible. The survey should be made plant by plant, for even in the same town two plants run by the same company may vary widely.

Getting unreserved and frank opinions from employees may be difficult. It is best to have the survey handled by an outside opinion-gathering organization.

How to Sell Cost Cutting?

First, management must sell workers on good management. Selling cost reduction by itself is not a package salable to the worker. The aim of management and the worker both is security . . . company security. Sell it to him.

Layoffs will undoubtedly come into the picture. This is a prime security point with workers. If such layoffs are necessitated during the cost-cutting readjustment, the worker should be interviewed. Questions should be answered simply and straightforwardly.

How to Tell About Cost Cutting?

Based on a knowledge of what people know and do not know, what they like and do not like, what they understand and fear, several simple steps should be followed in telling the cost-cutting story to workers.

How To Cut Costs

About that September Issue

What Will It Have?

. . . 10-page report to management on how to design for lower costs.

What Do They Cover?

. . . Cost-cutting solutions to many design problems. Design improvements that add sales values in quality and performance.

What Is Coming?

. . . A 24-page reader bonus in January to bring you more cost-cutting hints. And in other issues—more ideas on how to cut costs in your business.

same as the workers' interests. You must make them certain you are fully aware of their problems. In telling your cost-cutting story, make your story visual as well as oral. Easel presentations are good.

If the presentation is first given to supervisory personnel, follow up immediately with a session for workers. Face-to-face meetings are best. If impractical, a letter addressed to the workers at his home should tell the story. Several letters should be sent.

Second, management should make known what it has to offer. Whether the workers follow management's leadership or not will depend a great deal on how perceptively and thoroughly management makes its position clear. If business does not make known the goals it seeks to achieve for itself and its workers, the leadership the workers follow will not be management's.

Global talk of hard times as a need for cost cutting falls on deaf ears of workers. The worker wants to know how much sales are off, why they are, how production can offset losses. If they know these facts, they can go a long way to make cost cutting a success.

Workers all want better jobs. Given the reasons and the opportunity to help decide how to make those jobs better, they can make them better.—Factory, June, p66

Attracts Foreign Visitors

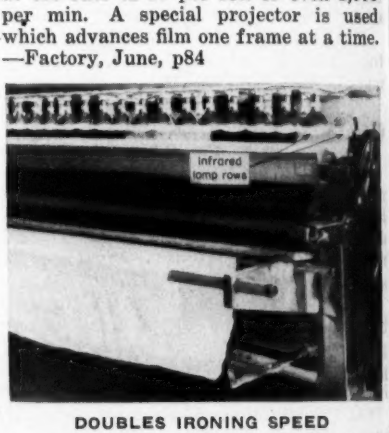
Visitors from England, France, Belgium, Norway, Sweden, Holland, Australia, and other countries have had particular interest in seeing Republic Steel Corp.'s high top pressure blast furnaces. Operation to date indicates a boost in pig-iron production of 10–15% with an appreciable reduction in coke consumption. One stack has increased production from 1,200 to 1,300 up to 1,500 tons a day with coke consumption dropping from 1,700–1,800 down to 1,550 lb. per ton of iron.—Steel, June 6, p80

Memomotion Study Camera Simplifies Work Analysis

Standard motion- and time-study costs and complexities can be reduced by using a new technique called memomotion. In memomotion, pictures of the operation under study are taken at the rate of one per sec. instead of the standard 16 per sec. used in micromotion studies. The old micromotion method cost $6.60 per 1-min. film. Memomotion costs $1.65.

The system is designed for use in motion studies of long cycles, irregular cycles, crew activities, or work or material flow over large areas and in time studies of jobs normally studied by stopwatch methods, lengthy or complex cycles, or crew jobs.

A special synchronous motor drive is attached to camera. Drive has three gear trains, a gear shift, and universal coupling. It permits pictures to be exposed at the rate of 10 per sec. or even 1,000 per min. A special projector is used which advances film one frame at a time. —Factory, June, p84



DOUBLES IRONING SPEED

Infrared lamps supplement steam heating of laundry ironer to double its output. Lamps in front row are mounted on 6-in. centers and 4 in. above the rolls. Rear row has lamps on 9-in. centers and 12 in. above the rolls. Additional heat eliminated one of the two passes of work through the ironer.—Elec World, Apr 23, p126

Nitric Acid Produced from the Atmosphere

Nitrogen fixation leading direct to nitric acid is the goal of a new pilot plant of Food Machinery & Chemical Corp. This summer it should be producing 1,000 lb. of acid per hr.

The process works like this: (1) air is preheated; (2) part is used in burning gas to reach 4,000° F. temperature; (3) nitrogen and oxygen in air react to form 3% nitric acid; (4) hot gas is quenched to prevent decomposition of oxide; (5) cooled gas passes over silica-gel bed for adsorption of nitric acid and catalysis of nitric-oxide oxidation to nitrogen dioxide; (6) small quantity of hot gas absorbs nitrogen dioxide; and (7) the gas stream is absorbed in water to form nitric acid.

Furnace is a horizontal pebble-bed unit with two connecting chambers. Refractory lining and pebbles are magnesia. Chambers are 12 ft. long, of 12-in. I.D.

If magnesia lining and pebbles spall too much, stabilized zirconia may be used.—Chem Eng, June, p70

Combination Lube-Oil Plant

Shell Oil Co., Inc.'s, Houston refinery now has in operation a new combination lube plant. It consists of a propane-deasphalting unit and a phenol-extraction unit, both having common facilities and control.

Production from the first unit, 4,500 bbl. per day of reduced crude, becomes part of the feed to the 5,800-bbl. daily phenol-extraction unit. This latter pare is made up of five towers.

Oil feed is contacted with phenol in a treating tower, and phenol is removed from the extract solution in the phenol tower. The three other towers are extract stripper, raffinate column, and absorber. The whole unit was designed and built by M. W. Kellogg Co.—Oil & Gas J, May 26, p98

XF-90 TRANSONIC FIGHTER

U. S. Air Force's new XF-90 is powered by two Westinghouse axial-flow turbojets set side-by-side. Combined width of the engines —about 5 ft.—gives the plane a laterally elliptical shape rather than the more normal vertical elliptical shape. Each engine delivers 3,000-lb. static thrust. They employ two turbine stages instead of the standard single stage. Wing has a maximum thickness of 8% of chord. Wing is swept back 35%. Maximum speed is Mach 0.9; design speed is Mach 1.—Aviation Wk, May 23, p12

Pasteurizing Ice-Cream Mix

At the modern ice-cream plant of Hershey Creamery Co., ice-cream mix is subjected to high-temperature, short-time pasteurization.

The mix is heated in two steps. First, it is pumped through the 16 tubes of the heater and raised from 130° to 175° F. Leaving the first section of the heater, it flows to two homogenizers. The mix, after homogenizing, returns to the heater and passes through an additional eight tubes in which it is held for 25 sec.—the length of time found necessary to pasteurize ice-cream mix.—Food Ind, June, p42

Technical Shorts

"Can We Make It?"—A bulletin board in the manufacturing-engineering department of Saginaw Steering Gear Div., General Motors., Corp., asks "We are now buying this part. Can we make it" The part and the number purchased each week are shown. Board has helped stimulate thought on how purchased parts can be made in the shop.—Factory, June, p136

Curbs Bacterial Spoilage—Daily bacterial surveys in canneries have shown these results: 33% drop in potential flat sour spoilage of peas and 1½% drop in actual warehouse spoilage. Without daily surveys, there is no way to control bacterial build-up that takes place in a population cycle.—Food Ind, June, p46

Reduces Foundry Smoke—Small brass foundries can reduce smoke and air pollution by using finely-ground silicate material as slag on surface of molten metal. Preliminary results of experimental work indicate that slag crust will substitute for bagging equipment.—Iron Age, June 9, p86

For Better Looks—General Electric Co. is studing the appearance of foods under fluorescent lighting. Color preference tests are being made with a large number of viewers to find the light shade that makes food appear most attractive. Similar experimentation was conducted on human complexions so more intelligent color in lighting could be engineered to make complexions look better.—Elec West, May, p74

Speeds Grandstand Decking—Precast channel-shaped slabs of lightweight pumice aggregate concrete were used to extend a Los Angeles grandstand. Slabs were 10 ft. 7 in. long, 18 in. wide, 6 in. deep. No on-the-job formwork or pouring was necessary. Pumice aggregate permitted cutting slabs with an electric hand saw.—Eng News-Rec, June 2, p20

Liquid Flux Brazing—Molten brazing metal can be made to flow easily into holes, cracks, and porous sections by use of liquid flux. Flux container is attached to cylinder truck, and flux is picked up by stream of fuel gas, thus making it available right at the work surface.—Weld Eng, June, p76

Jet Fuel Cools Oil—U. S. Air Force's J-47 jet engine oil coolers will use jet fuel instead of air as the coolant. The kidney-shaped unit, 3 in. thick, fits snuggly to engine. It will withstand greater pressures than previous coolers. Heat is transferred through tube walls to fuel circulated around tubes.—Aviation Wk, May 16, p39

TESTS TUBING 13 MI. LONG

General Electric Co. used its own halide leak detector in making and testing 13 mi. of ⅛-in. O.D. copper tubing. Tube in lengths of 100 ft. was induction-brazed to mile-long lengths. Each length was filled with mixture of eight parts nitrogen and one part Freon, then run through the pickup illustrated at 1 fps. Seven of 675 joints showed leaks.—Chem Eng, May, p158

Facilitates Nep Counting—Templets designed by the North Carolina State College School of Textiles facilitates nep counting. Templets are metal plates with 10 or 20 1-in. dia holes. Back has an undercut clamp to hold the velvet-cover pick-up plate.—Textile World, June, p142

World's Safety Record—Du Pont's nylon plant at Martinsville, Va., operated for 82 months without a lost-time injury. The best no-injury record known to the National Safety Council, it may be the world's record. —Chem Eng, June, p74

To Dry Laid-up Boilers—Moisture can be eliminated in out-of-service boilers by using the type of static dehumidifiers employed by U. S. Army and Navy in laying up guns and ships. Dehumidifiers are aluminum containers of activated silica gel, which absorbs water. They can be removed occasionally and dried out in ovens.—Power, June, p128

Plastics Conduct Electricity—U. S. Naval Ordnance Laboratory is working on electrically conducting plastics. Primary uses will be lightweight electroplated parts and molded variable resistors having conductivity of copper.—Prod Eng, June, p5

igures Shim Size—Cut-and-try methods and volved calculations can be forgotten about trying to find the shim size when lining up achines before coupling. A three-part circular computer, easy to make and assemble, ves the correct shim size by a simple slide-le type of operation.—Oper Eng, June, p32

akes Electrospraying Possible—Addition of positively charged material to the structural minate Panelyte makes electrostatic spray-g possible. Saved will be hand-spraying ne, 40% of the paint previously used, and e costly waterfall paint reclamation sys-m. Servel, Inc., developed the process.—d Plastics, June, p136

st Small-part Handling — Small castings d machined parts can be unloaded at work-nch height by using a hinged, drop-bottom id bin. The bin has an eye welded to its nged end for support by a hook attached the fork-truck mast while the forks lower dump the load.—Iron Age, May 26, p69

eramic-wall Tubes—Use of low-loss ceramics place of glass for electronic-tube envelopes under study. Three sealing techniques vestigated are sintering of metal on ce-mic, compression of metal on ceramic and e of titanium hydride as flux for hard lder.—Electronics, June, p168

opular Fluorescents—Of stores modernized U. S. since the war, 54% installed fluo-scent lighting, 17% incandescent, 9% slim-ne, and 5% cold cathode. The three less popu-r methods were employed in conjunction ith fluorescents.—Elec World, June 4, p53

orld's Safety Record—Du Pont's nylon ant at Martinsville, Va., operated for 82 onths without a lost-time injury. The best o-injury record known to the National afety Council, it may be the world's record. -Chem Eng, June, p74

luminum Walls for Aluminum Co. Office—alls of the Aluminum Co. of America's Dav-nport office building are of cast aluminum. eets are backed up by 4-in. thick precast ghtweight concrete walls; are fire-resistance r 4 hr.—Eng News-Rec, June 9, p66

Checks Desizing—A simple method to determine residual starch may be used on desized cloth or on cloth that has been desized, scoured, and bleached. Varying amounts of starch may be measured by dropping standardized iodine on the goods and comparing color with samples of known quantities of starch. Quantity of starch is determined by a comparison of the shade of color resulting. —Textile World, June, p125

Curbs Bacterial Spoilage—Daily bacterial surveys in canneries have shown these results: 33% drop in potential flat sour spoilage of peas and 1½% drop in actual warehouse spoilage. Without daily surveys, there is no way to control bacterial build-up that takes place in a population cycle.—Food Ind, June, p46

Hard Drilling—Oleic acid will keep drills cool and lengthen life between grinds when hard steels, such as drill rod, must be drilled. Tests were conducted with pure acid, then a switch was made to "technical grade", it costs less, works as well.—Am Mach, June 2, p133

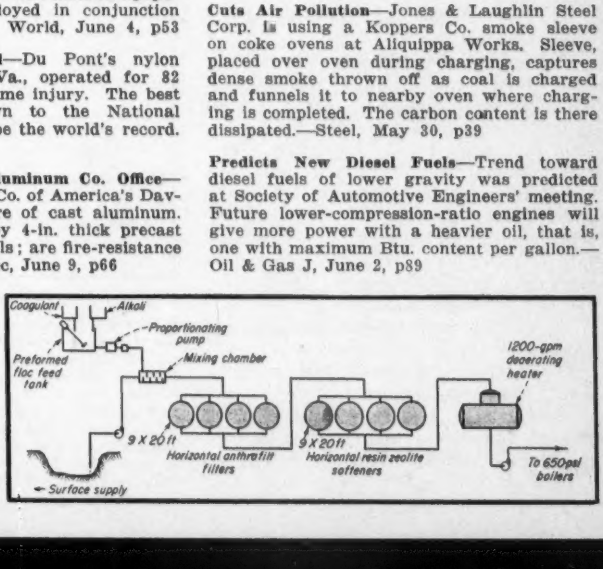
Protect Piled Cartons—Triangular metal corners which slide under pallets are used at American Greeting Publishers Inc. to protect corners of piled cartons. Metal protectors are brightly painted . . . Falk Corp. uses yellow-painted raised aisle markers to outline parts in storage. Shop rules require all stock, tools, and equipment be behind the bevelled markers.—Factory, June, p134

Cuts Air Pollution—Jones & Laughlin Steel Corp. is using a Koppers Co. smoke sleeve on coke ovens at Aliquippa Works. Sleeve, placed over oven during charging, captures dense smoke thrown off as coal is charged and funnels it to nearby oven where charging is completed. The carbon content is there dissipated.—Steel, May 30, p39

Predicts New Diesel Fuels—Trend toward diesel fuels of lower gravity was predicted at Society of Automotive Engineers' meeting. Future lower-compression-ratio engines will give more power with a heavier oil, that is, one with maximum Btu. content per gallon.—Oil & Gas J, June 2, p89

EEDWATER COSTS

ower feedwater treat-g costs resulted from nversion from green and to resin zeolite in eel-mill's filtration rd sodium-zeolite ftening plant. Effluent contains less than ppm. total hardness. -Power, June, p100



Suggested Uses for Isotopes

Industry has already made some valuable use of radioisotopes, but is doing so has only begun to realize all their potential adaptation

POSSIBLE USES for radioisotopes are many, so the following list, taken from a report by the National Research Council of Canada, is not offered as complete. It is presented to inspire ideas on how industry can advance its methods by isotope study.

1. Calibration of ultra microbalances with alpha-active material. Calibration is improved as activity can be determined more accurately than weight.

2. Use of tracers to determine the concentration of an ion in process control, as in electroplating baths.

3. Use of tracers in the analysis of a product from a reaction mixture of known composition.

4. Study of the cause and cure of foaming and priming.

5. Distribution measurements of textile finishes, such as of lubricant on rayon fiber to evaluate its role in dyeing and spinning.

6. Flow studies of components of process operations.

7. Process rate studies.

8. Product control, as in manufacture of analytical reagents, pigments, ceramics.

9. Tracer study of distillation. Determination of equilibrium data and measurement of operating efficiency are paramount problems. Concentration of tracer-containing impurities may be used for control of a process where concentrations are not sufficient for automatic control by temperature.

10. Use of radioisotopes in metering fluid.

11. Determining effectiveness of scrubbing gases by tracer use.

12. Tracer analysis of relative efficiencies of absorbents and separation efficiencies in centrifugation and filtration.

13. Determining the homogeneity of a mixture by withdrawal of samples and comparison of tracer results.

14. Determining the settling rate of a suspension.

15. Measuring of liquid flow velocity by timing successive appearance of activity at two points.

16. Use of radiocarbon to study copolymerization.

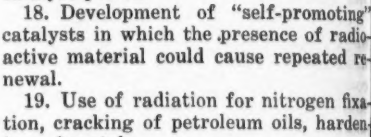
17. Use of tracers to determine vapor pressures and to discover and isolate catalyst poison.

18. Development of "self-promoting" catalysts in which the presence of radioactive material could cause repeated renewal.

19. Use of radiation for nitrogen fixation, cracking of petroleum oils, hardening of metals.

• 20. Friction and wear tests in engines.

21. Study of the mechanism of mineral flotation.



CLEANS AIR TRAP

Power plant at Curtiss-Wright Corp. cleans air traps by backwashing them with steam. In normal operation, valves A and B are open, whereas C and D are closed. Closing B stops trap discharge. When trap is nearly full, A is closed and C is opened to admit condensate from separator. Valve D is opened, slightly at first and then wide. Counterflow blows out the trap.—Power, May, p77

22. Quality control, as the measurement of cupola-level height and sheet thicknesses.

23. Measuring tarnish resistance of silver plates.

24. Determining the transfer of printing ink from printing plate to paper.—Nucleonics, May p130

Paper-Coating Process Utilizes Ion Exchange

New paper-coating method depends on precipitation of coating by ion exchange rather than by impregnation of fiber. It provides a smooth, level surface that does not follow the contour of the raw stock.

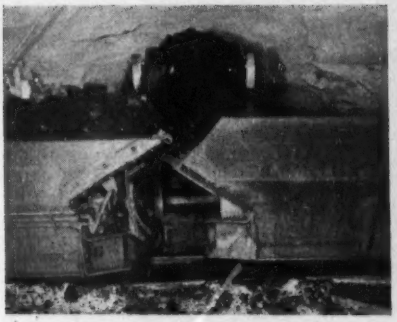
Coating mix contains clay, dilute aqueous sodium hydroxide as solvent, and hydroxy alkyl cellulose as adhesive. After coating, surface is contacted with a salt solution capable of ion exchange with sodium hydroxide present. This precipitates the hydroxy alkyl cellulose.

All excess setting solution and some of the water in the original coating are squeezed out by passing the sheet through two rollers. The paper is then dried under tension.

The coated paper can be used without calendering. Other advantages claimed for the process are greater brightness, better opacity, greater affinity for ink, better adhesion of ink to surface, and greater insolubility.—Paper Ind & World, May, p184

Spin Larger, Longer Packages

Larger packages can be spun with normal-size rings on larger instead of thicker bobbins on McGlynn Hays Industries, Inc.'s, new 400-spindle, dual-drive spinning unit. Machine operates on the Bradford system. A rising-draft mechanism causes drafting element to rise as package is built. A 2-stage draft unit provides normal drafts between 15 and 20 and up to 30 in some cases.—Textile World, June, p141



OVERLAPPING MINE CARS

Designed to prevent spillage when receiving coal from non-stop conveyors, 100 of these overlapping end, drop-bottom mine cars are in use at Black Star Coal Co. Cars dump as a trip without uncoupling. Cars are 38 in. high and carry 15 tons. Overlap is 3 in., which is sufficient to prevent spillage if there is no slack in the coupling.—Coal Age, June, p92

Electronic Spark-Plug Tester

Spark plugs are tested by comparing the sparking qualities of the plug under test with those of a good plug subjected to the same pressure and voltage. This comparison is usually made by taking readings at which increasing air pressure extinguishes the spark.

Necessary high voltage can be provided by a vibrator and spark coil. A newly developed electronic unit, however, avoids the disadvantages of vibrators. This unit comprises a rectifier tube, resistance-capacitance networks, and input and output transformers. It is capable of attaining much higher voltages than the 20,000 volts used in spark-plug testing.

Other possible applications would be in ignition systems of internal combustion engines, in television circuits to supply high voltage for picture tube, for synchronizing motion-picture film to transmission by television, and in guided missiles.—Electronics, June, p104

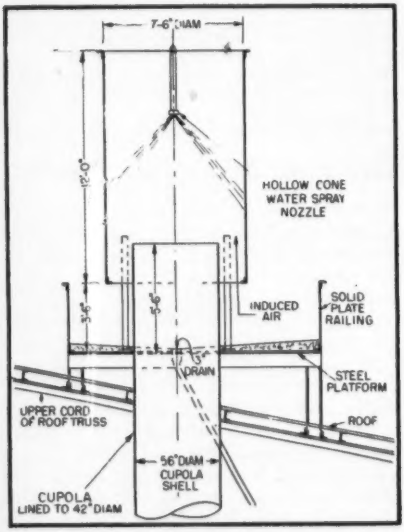
Develop Automatic Air-Break Sectionalizing Switches

Automatic sectionalizing mechanism has been applied by Idaho Power Co. to gang-operated pole-top switches installed at five points along an isolated power line. Purpose is to isolate any trouble and restore service, especially in winter.

The apparatus gets power from a capacitor potential device connected ahead of each switch. Utilizing pneumatic power, it opens pole-top switch 90 sec. after line voltage fails and closes it 75 sec. after voltage returns.

When breaker is closed, line sections pick up at 75-sec. intervals until faulty section is connected, again tripping the breaker. Timing permits operator to determine which switch picked up the faulty line section.

After a delay to allow switches to reopen, a carrier-current device may be used to lock out the proper switch, isolate trouble, and restore service to the good section of the line.—Elec West, May, p64



CUPOLA DUST ARRESTER

Simple cupola dust and spark arrester, used at Pohlman Foundry Co., consists of steel shell, hollow-cone water spray nozzle, and platform on which dust-laden water collects. Water spray quenches cupola flame and precipitates ash and cinders in the smoke. Air drawn between cupola and shell keeps the shell cool and actually permits operation without water.—Foundry, May, p148

Checks Engine Lubrication

Steam-engine lubrication can be checked without shutting down the unit and examining the cylinder surfaces. As oil intermingles with steam, a sample drawn from the cylinder contains oil as well as steam.

This can be detected by a device connected to the valve opening provided for the steam indicator. This device holds filter paper and lets the steam-oil mixture strike it for a definite number of strokes.

When the paper dries, the oil leaves a characteristic brown stain. Variation in shade and characteristics of stain pattern indicate efficiency of lubrication, excessive condensation if present, and any engine wear. Only ½ hr. is required to test an engine.—Power, June, p104

Simplify Roller Burnishing

Burnishing of radiused fillets and snap-ring grooves on rear axles and on pinion shafts for main drives of Allis-Chalmers tractor prevents fatigue failures. Until recently, burnishing rollers were mounted in heavy shanks clamped solidly in lathe toolposts.

The operation was difficult to perform within close limits. So all roller holders are now arranged so they will "float" in the radius being burnished. This is done by making tool shank narrower than tool post slot to provide floating action around a vertical bolt. Result is better work finish.—Am Mach, June 2, p102

World's Largest Range Plant

Highly mechanized production, extensive conveyor system, and radial-ring high-voltage distribution feature Hotpoints' new range plant in Chicago

ELECTRIC-RANGE plant of Hotpoint, Inc. is claimed to be the largest in the world devoted exclusively to production of electric ranges. New mass-production techniques, incorporating automatic materials flow and equipment control, give the 1-million sq. ft. plant a rated capacity of 600,000 ranges per year.

Specially designed machinery contributes notably to the efficiency of the closely integrated production system. There are 7½ mi. of conveyor (mostly overhead). Eight infrared ovens dry prime enamel coats. Four 1,125-kw. electric furnaces bake the enamel.

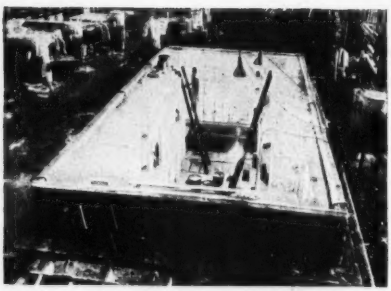
Uninterrupted production is assured by the carefully engineered electrical distribution system, which serves a 19,500-kva. load. The primary distribution normally functions as a modified radial system but can be converted quickly to a ring type in an emergency.

Transformers, in general, are installed in groups of two. Each transformer in a dual substation has two primary potheads—one for feeding it and the other for an emergency tie-feeder between two units. Should a primary plant feeder fail, transformer effected can be shifted to the other feeder by the tie cable.

Throughout the plant, extensive automatic control has been applied to both production equipment and conveyor system. Production is so closely scheduled that a piece of steel received in the morning leaves the plant in the afternoon as finished product.

An outstanding example of this mechanized production is the 450-ton, 8-station, range-drawer press (above). It requires 17 motors to operate its rain, elevator, positioning devices, clamp cars, and lubrication system. Wiring cost for one press was $18,000.

The range-body line is made up of four presses, folding machine, tack welders, and two tunnel-type resistance welders. Line operation is electrically timed, controlled, and interlocked.—Elec C&M, June, p49



MOLDING A BIG PRESS

Drag mold for large Bliss press is made partly in pit, partly in flasks above floor level. Drag depth is 10 ft. with 6 ft. in pit. Length is 26 ft. Drag will be covered with flat cope 2 ft. high. Mold is dried with portable units developed by Bliss. Made of cast iron 2 ft. in dia. and 3 ft. high, they are mounted on angle-iron legs 12 in. high. They are heated with coke and equipped with electric blowers.—Foundry, June, p92

Color Film Has Polymer Base

Replacing the standard gelatin base used in movie film, E. I. du Pont de Nemours & Co., Inc.'s new movie film uses a polymer base It is cheaper than the gelatin and has constant chemical properties. Also included in the polymer base is the binder for the three emulsion layers. Image will be sharper as the color-forming element is part of the polymer.

Color prints can be made from three black-and-white separation negatives of the type now used in technicolor cameras. —Business Wk, June 11, p22

Unit to Check Crash Cause

An omnidirectional accelerometer, developed by U. S. Office of Naval Research, will check causes of airplane accidents. The self-contained 2¼x2¼x3-in. unit needs no external power sourse and weighs only 2¼ lb. It records G forces and their duration. Device is now undergoing tests at the Bureau of Standards.—Aviation Wk, June 13, p22

All-Basic Openhearth Not Proved Commercially

Carnegie-Illinois all-basic openhearth furnace has produced nearly 1,400 heats since June 1947. Evaluation of experience to date shows that over-all economy is not yet satisfactory.

Cost of fuel and hot-work repairs has more than offset the favorable effect of increased production on pertinent items of cost by 2% of the total. Eventual repair cost depends on finding out more about the mechanism of failure of basic brick in openhearth service.

Laboratory studies indicate that brick destruction can be effected, when iron oxide is absorbed into the brick, by subjecting it to alternate cycles of heating to openhearth temperatures and cooling to 2200°F.

Fuel economy is a problem. Consumption was 7% higher than shop average. This is accounted for by increased firing rates and greater radiation losses in basic brick as compared to silica brick.—Iron Age, Apr 28, p78

Electric-Furnace O_2 Flow Rate

Injection rate for oxygen into steel-making electric furnaces (see McG-H Digest, Nov '48, p41) depends on several factors. As far as chemical efficiency is concerned, the best injection rate appears to be 100 cfm. per ton of charge.

While oxidation of bath increases with injection rate, carbon drop can become, at some point, too rapid for good control. Also, high rates on medium- and high-carbon steels cause a violent evolution of carbon monoxide, splashing slag on roof and side walls.

The practical injection rate varies, depending on nature of charge and other conditions. For carbon steels a rate of 20–30 cfm. per ton gives reasonable control, while for stainless steel it can be raised to as high as 40 cfm.—Steel, June 6, p126

Service to Digest Readers

As an added service to McGraw-Hill Digest readers, the following special reports from other McGraw-Hill publications are made available for purchase. These reports, too long for inclusion in the Digest, will be sent on receipt of one dollar ($1.00) for each report desired. Address Editor, McGraw-Hill Digest, 330 West 42nd St., New York 18, N. Y., U.S.A.

Building Heating—This 20-page report treats the equipment needed for building heating systems and the ways in which it is applied for effective heating. It covers heating theory, distribution, and the work auxiliary equipment does.—Power, June

Flow of Fluids—A group of 15 articles, totaling 48 pages, surveys the tremendous progress made in fluid flow, treating theory and technology as well as the modern equipment that has been developed.—Chem Eng, May

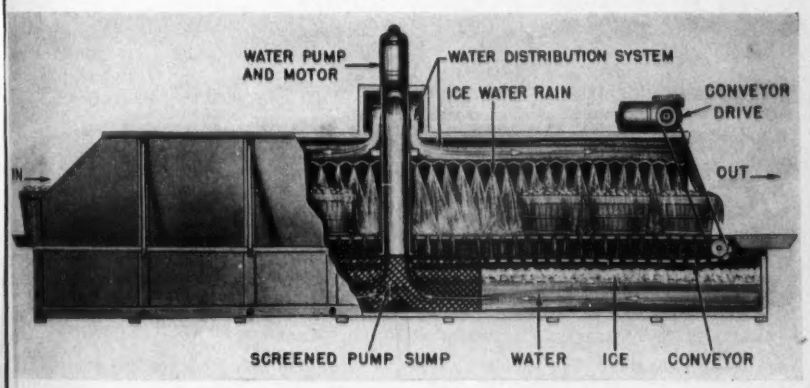
How to Use More Color in the Shop—This 4-color, 16-page report tells you when, why, and how to use color to improve production, morale, maintenance, and safety. It gives rules, it tells how to plan. —Am Mach, June 2

Welding-Through Sheet Steel

By adapting a welding-through technique with automatic hidden-arc process, Lawson Mfg. Co. has reduced cost of making radiation chambers for gas-air heating units.

These rectangular chambers are made of two halves pressed out of 20-gage sheet steel with conventional welding flanges. The halves are welded together at high travel speeds by making the weld directly through the upper sheet (like a spot weld). The work, held in a fixture, is moved under the stationary welding head by hand.

Work speed is 120 ipm. Welding current is 280 amp. at 25 volts. The electrode is a 3/32-in. copper-coated wire. Pressure test pads show no tendency to fail at 100-psi. pressure.—Weld Eng, May, p30



ANTISEPTIC COOLING RETAINS TOP QUALITY

Crated fruits and vegetables can be cooled quickly in this Food Machinery & Chemical Corp. 26-ft. long Stericooler by a flood of chlorinated water. Crushed ice brings water to about 33° F. Water contains chlorine and hypochlorite solutions to disinfect the produce. Crated asparagus is cooled 12-14 min. to prevent "rusting" prior to canning. A concentration of 100 ppm. of available chlorine is satisfactory. Antiseptic cooling of peas is particularly invaluable to slow the internal heating rate.—Food Ind, June, p57

How to Set Up Control System for Spray Painting

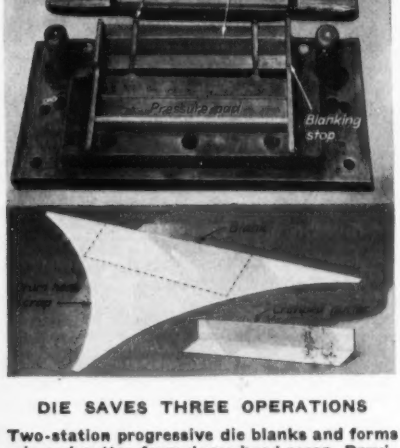
Spray painting is the most expensive shop method of paint application. To control its cost, a five-step program has been found effective.

First step is to study the job to determine if it must be sprayed or whether the cheaper dip or flowcoat methods are applicable. If it must be sprayed, the next step is to put the job on an incentive basis.

The third step is to standardize all spray equipment and adjustments. Some operators boost air pressure in an effort to get greater speed, but actually it has the opposite effect. Best working pressure is the minimum required to atomize the paint.

Step four is to establish controls on the liquid paint. Viscosity and total solids should be controlled to assure production of desired film thickness.

The fifth step is operator training in spray motion. For example, an operator should be trained to make the same number of passes per piece, to hold the gun at the proper distance, and to limit the motion of the gun as it passes the end of the work.—Iron Age, May 19, p96



DIE SAVES THREE OPERATIONS

Two-station progressive die blanks and forms crimped gutter from drum-head scrap. Previous method involved three shear cuts and one forming operation. Blanking is done by shear blades on die shoe. Pressure pad raises blank out of blanking station. Blank slides on pressure-pad arms to forming stops. Next stroke forms gutter, which is then lifted by the arms out of the die and falls into a rear chute.—Am Mach, June 2, p101

High-Pressure Laminate Tile

Wallco, a high pressure laminate wall tile developed by Leathertone, Inc., is simple to apply for refinishing home walls. Tiles are flat phenolic core, melamine-surfaced, paper-laminate sheets available in seven sizes and nine colors. Melamine pigmented resins give color to surface. They are applied with a styrene-butadiene copolymer adhesive.

Wall surface must be smooth and level for proper application. Wall and one face of tile are brush-coated with adhesives and permitted to dry for 20 min. Tile is then set in place—not slid. Hand pressure is sufficient for good adhesion. Firm set develops in 7-10 days.—Mod Plastics, June, p77

Filters Present Fire Hazard

Metal or electrostatic filters can be fire hazards. Both types come in stationary or self-washing designs. But in removing dirt from the air, the filters choke up with dust and lint and so become dangerous.

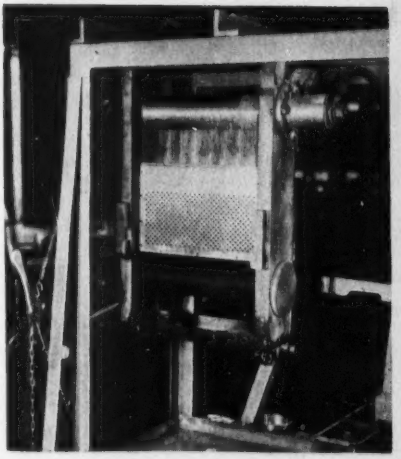
They can be made safe by installing automatic sprinkler systems. With such sprinklers going, any fire in the system stops at the electrostatic curtain or the metal plate. Also desirable is replacement of oil with a non-flammable liquid as the filter-bath fluid.—Oper Eng, June, p34

RR Car Maintenance Shops Feature Painting Facilities

The trend toward pastel interiors and bright exteriors of railroad passenger cars has forced changes in the painting facilities of modern maintenance shops. These lighter, brighter paints require more care in application and more frequent repainting. Modernization of old equipment to match new equipment imposes an added load on existing facilities.

One maintenance shop uses two combination spraying and drying booths, each equipped with air filters, thermostatic controls for painting and drying temperatures, filtering units to reclaim paint particles from the air. Air enters booth through filters at front end and flows to the rear where paint particles are removed by a mixture of water and a coagulating compound.

Another shop employs a single-track area walled off from the rest of the maintenance area. At one end of the "booth" is a small painting section for small parts. Both booths are equipped with a water wall.—Railway Mech Eng, June, p309



ELECTROPLATES WIRE

Silicon-bronze wire is electroplated with 80% Co, 20% Ni alloy at Brush Development Co. for use in wire recorders, similar devices. It is run through bath at 135 fpm. in a helical path on two rollers. One Co-Ni alloy is inside wire helix, other outside. Method is periodic reverse current system. Coating on 0.004-in. wire is 0.0003 in.—Iron Age, June 9, p49

Advanced Textile Engineering

Stoffel & Co.'s Lichtensteig, Switzerland, weaving mill, though built during wartime material shortages, is a model of advanced textile engineering. Two boilers supply the plant with hot water. One boiler operates on coal, the other on coal or electricity.

Steam passes through reduction valve (reducing steam to a constant 85-psi. pressure) to a cascade. Transformed to 227° F. water, it has an efficiency of 85% if the caloric value of coal or electricity is considered as 100%.

Steam is used only in such operations as sizing. Advantages of the hot-water system are no heat loss during return of heat to boiler house and the possibility of varying temperatures of each pipe according to temperature required at the machine.

All piping and cables are carried in underground tunnels, no service piping being placed in the plant itself. Connections are made through the floor.—Textile World, June, p101

Helical Heat Exchange

A new type heat exchange for milk products has a helical groove around its core. The milk passes through this helical path between core and steamjacket housing. Steam is applied also to the interior of the core. Main advantage of the heat exchanger is that it reduces the filming characteristics of the milk. It was designed by the Bureau of Dairy Industry.—Food Ind, June, p72

Ultrasonics Gain in Industry

Tremendous growth in science of ultrasonics in past few years promises wider application, possibly rivaling many older industrial methods

INDUSTRY IS FINDING an increasing number of uses for the unique properties of ultrasonic waves. Frequencies of these waves range from 20,000 (upper limit of average human hearing) up to 500-million cycles per sec., although the higher ranges have not yet been applied.

Frequencies of 20,000 to 100,000 cycles are used for sound ranging, submarine signaling, and communications. Those of 100,000 to 10-million cycles are suitable for testing materials for flaws.

Other typical frequencies: 25 kc. for ultrasonic control apparatus, 90 kc.-top limit for tuning forks, 400 kc. for emulsion and agitation, 500 kc. for testing of large-grain material, 750 kc. for experimental biological work, 5,000 kc. for testing of extremely fine homogenous material, and 15,000 kc. for radar trainer, absorption measurements, delay lines.

Ultrasonic testing methods are applicable to most metals, to many of the denser plastics and glasses, and to other materials of lower density by use of special frequencies. Tool steels, forgings, and castings are well adapted to ultrasonic test.

Types of flaws detectable include blow holes, bursts, flakes, inclusions, seams, segregations, and laps. The flaws to be found must be larger than natural discontinuities or changes in grain size.

Also, the minimum size varies with the distance from the instrument. A rough measurement is that an ultrasonic tester will find a flaw of a size about 0.1% of part thickness. If flaw is larger than 0.04 in. dia., it can be detected regardless of part thickness.

Wall thickness can be measured by reflection in the same way a flaw is detected. It is difficult to measure walls less than ½ in. thick or badly corroded.

New problems are continually cropping up in ultrasonic testing. One field under investigation is testing of materials characterized by large grain size or many small dispersed cracks or flaws.

A use for ultrasonics, of particular importance in chemical processing, is in agitation of liquids. The more practical aspects of this field are still largely unexplored, although much information is already available. Generating units are standard.

The possible breadth to ultrasonic application is shown by its use to obtain a television picture. The basis of such a system is the ultrasonic cell, which consists of a body of liquid through which the ultrasonic waves pass and, in turn, modulate the light. By using the phenomenon of light defraction, the system can give much greater illumination than most other television methods.—*From "Ultrasonics," 270p book published by McGraw-Hill Book Co.*

SOUTH AFRICAN SCARE CROW

Electricity Supply Commission, Johannesburg, uses this type guard on 33-kv. lines to keep off big birds. Tubular crossarm carries protective netting. Another guard is mounted above the insulator crossarm. It has two vertical legs between insulators and pole that tend to discourage birds alighting on insulator or crossarm.—Elec World, June 4, p100

Concrete Walls Poured Flat, Then Tilted into Place

The tilt-up system of concrete-wall construction has resulted in costs substantially below those of conventional methods. The system, called Panel-Crete, was developed by Los Angeles contractors Buttress & McClellan, Inc.

Wall panels are cast on the reinforced concrete floor of the building, thus leaving the finished walls free of form marks. Before pouring, the floor is covered with an emulsion, and low curb-like forms, steel sash, and door frames are laid in place.

Poured panels are trowel-finished and hoisted into place by cranes. They are anchoried by welding or by pouring columns between panels. No separate finishing is required once walls are up.

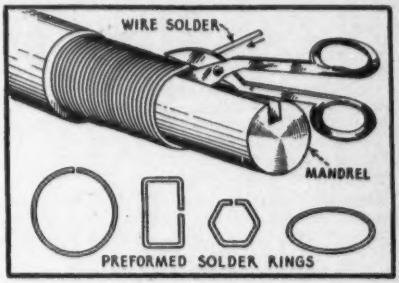
Cost of a Panel-Crete wall is three-fourths the cost of comparable brick construction and only one-half that of standard poured concrete.—Am Builder, June, p118

Automatic Chemical Analyzer

A practical instrument is now available to supplement and extend chemical analysis. It can analyze in a few minutes such mixtures as wood and grain alcohols dissolved in water, telling what compounds are present and how much of each.

The instrument is based on experimental work of the Indian physicist Sir C. V. Raman who found that many compounds give off a weak light when illuminated by mercury light. The sample light is passed through a highspeed spectrograph to break it into its colors. Each compound gives a unique pattern of lines that identify that substance in mixtures.

The unit, made by Lane-Wells Co., can also measure the sample light directly by a system of electronic tubes and amplifiers. A pen recorder produces a graph of sample's Raman lines on a roll of chart paper.—Electronics, June, p116



PREFORMS SOLDER RINGS

Solder preforms, to be used in induction soldering, are easily made by wrapping resin-core wire solder on suitable shaped mandrel. A keyway permits cutting the turns with shears after winding.—Am Mach, June 16, p78

Speeds Timber Framing

Timber-framing equipment, much of it built in the shops of Lake Shore Mines, Ltd., Ontario, has permitted the company to process much of its timbering above rather than below ground. All chutes, raise timbers, grizzly blocks, rill cleats, face blocks, mill hole and manway timbers are prefabricated above ground in the timber yard.

Pneumatic nailing machine permits one man to make 250–300 hollow cushion blocks per shift. Previously 100 per shift could be made by hand. Unit drives four 5-in. nails at once. Caps are framed at both ends at once. Cap is made in 50 sec. Five men stack and feed caps.—Eng & Min J, May, p72

Casts Welding Rods

Crucible Steel Co. is now casting welding rods in graphite molds. These rods are used to provide a hard surfacing metal which can be welded to softer metals. In casting, the cobalt or iron-alloy metal is poured at 2800-3100° F. into a shank ladle, then into the molds set vertical.—Foundry, June, p220

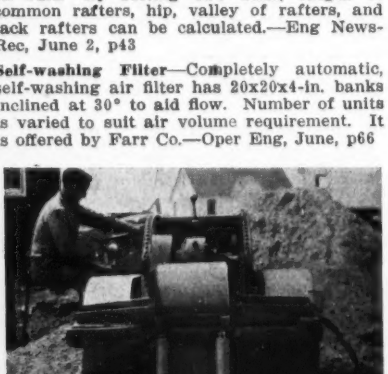
New Products

Powdered Nitrile Rubber—Hycar OR-15, a modified acrylonitrile-butadiene copolymer made by B. F. Goodrich Chemical Co., is now available in powder form. It is intended especially for mill and Banbury blending with phenolic resins.—Chem Eng, June, p180

Reduces Vibration—Connecticut Hard Rubber Co.'s Shock Stops reduce vibrations 75-90% where frequency is 1,000-3,000 cycles per min. They are available in 18x18-in. sheets or in round shapes of 2¼ or 3¼ in dia.—Electronics, June, p202

Calculates Rafter Lengths, Cuts—Lengths and cuts of any roof rafter can be calculated quickly by a plastic slide rule designed by Edward Weyer. Diagram of a roof is printed on rule. By setting two dials, length of common rafters, hip, valley of rafters, and jack rafters can be calculated.—Eng News-Rec, June 2, p43

Self-washing Filter—Completely automatic, self-washing air filter has 20x20x4-in. banks inclined at 30° to aid flow. Number of units is varied to suit air volume requirement. It is offered by Farr Co.—Oper Eng, June, p66



DIGS SMALL TRENCHES

Small utility trenches 5-7½ in. wide and up to 48 in. deep can be dug with this Parsons Co. "Trenchmobile." Conveyor is reversible to dump dirt on either side of the trench. Unit is powered by a 24-hp. air-cooled engine. Trencher has a road speed of 18.5 mph. Bucket chain is heat-treated alloy steel.—Cons Meth, June, p129

Easy Workholding—Kearney & Trecker Corp. has developed knee-type milling machines that incorporate a built-in chucking table. It can handle irregularly shaped work-pieces without use of costly special tools and fixtures. Three types of vise jaws can be mounted on master jaw bases on the table to hold different kinds of work. Machine sizes are Nos. 4 and 5.—Am. Mach, June 16, p134

Bag Maker—Capable of making 120 double sealed bags per min., Roto Bag Machine Corp.'s new machine can handle most heat-sealable materials. General Electric's silicone rubber also has been adapted for the heat-sealing operation. Bag range is 2-9½ in. wide and 3-16 in. long.—Food Ind, June, p142

Portable Infrared—Six-lamp portable infrared heating and drying unit for electrical, automotive and manufacturing fields is offered by North American Electric Lamp Co. Mounted on casters, it is adjustable from 1½-6 ft. high and can be tilted.—Elec West, May, p48

Prismatic Glass Blocks—Prismatic glass blocks developed by American Structural Products Co. direct sunlight upwards, making shades unnecessary. Block is recommended for use in schools and other public buildings.—Cons Meth, June, p120

Magnetic Hand Sweeper—Equipped with a permanent-magnet tube, Multifinish Mfg. Co.'s sweeper picks up steel and iron particles from floors, driveways, powders, liquids. Magnet is tube-shaped and rotates with wheels in the same way as the brush in a vacuum cleaner.—Foundry, June, p235

Tank Heaters—Thermo-Flo heater, made by Brown Fintube Co., is designed for immersion heating within tanks. It is a tube-type unit and sets up a thermal flow, resulting in efficient heat transfer.—Oil & Gas J, May 26, p117

Slow-speed Stroboscope — High-intensity, short-flash stroboscope, Type 1532-A Strobolume, has been developed by General Radio Co. for study of low-speed machinery. Operation is continuous up to 45 flashes per min. and is possible up to 1,200 flashes per min. for a 15-sec. interval.—Elec World, June 15, p29

High-speed Compressing—F. J. Stokes Machine Co. is offering the B-2X rotary machine for compressing abrasive materials, such as powdered metals, glass, and ceramics. Production rate for parts up to ½ in. in dia. is 300 per min.—Steel, May 30, p97

...omatic Photo Recorder—Varitron Model ...camera is made by Photographic Products, ...c., for automatic recording of readings on ...ters and tracings on oscilloscopes. It can ...controlled by electric current, radio signal, ...sound.—Elec World, May 28, p29

...ds Stamping Edges—Thompson Grinder ... is offering the Truformatic for grinding ...vex or concave forms of irregular contour. ...has indexing table with two vertical fixture ...es, one for loading while the other holds ...rk in front of wheel. Wheel is crush-...rmed. Operation is automatic.—Am Mach, ...ne 2, p136

...lt-cooled DC. Motors—Totally enclosed dc. ...tors up to 200 hp. are available from Gen-...l Electric Co. with new-type cooling as-...mbly. Motors can operate at slow speeds ...r long periods of time. Two blowers, driven ...r induction motor, provide ventilation. Sys-...m makes full torque possible down to al-...st zero speed.—Oil & Gas J, Apr 28, p143

...ans Compressed Air—James A. Murphy ...Co.'s cleaner is made in four sizes from ...r to 2-in. pipe inlets. Air enters bottom ...amber at a tangent, is given whirling mo-...n to separate moisture, then rises through ...copper tangle, perforated barriers, and ...ree cotton felt disks.—Foundry, May, p278

...cker Carries Driver—Automatic Transpor-...ion Co. has announced a 130-in. stacker ...signed to bridge the gap between motor-...d hand truck and fork truck. Engineered ...a stacker, the "Transrider Stacker" carries ...e operator and has a 2,000-lb. capacity at ... in.—Paper Ind & World, May, p264

...r emergencies — An automatic, portable, ...ndby fluorescent light, made by Chatham ...oducts Co., is turned on by interruption ...f regular power supply. It is powered by ...y cell batteries, will provide 10 hr. of ...ht.—Elec World, Apr 23, p132

...olystyrene Berry Baskets — Polystyrene ...rry baskets weighing half an ounce have ...en developed by Allied Plastics Co. Perfo-...ted sides permit air to circulate more freely ...an in the standard veneer berry baskets. ...ey cost about twice as much.—Mod Pack-...ing, June, p112

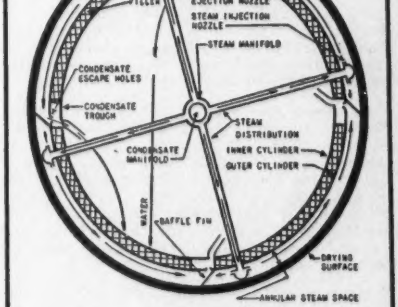
...ndles Unpalletized Loads—Tiered boxes ...a be handled without use of skids or pal-...ts with the "Bunnyhugger" attachment to ...dle & Towne Mfg. Co. lift trucks. Forks ...rasp load in a pincer movement. Capacity ... 3,750 lb.—Hardware Age, June 16, p106

...lycol Vaporizer—M. F. Robertson Sons Inc.'s ...Vapomatic" vaporizer uses a Fiberglas wick ...ed infrared lamp to disperse glycol vapors ...r prevention of colds. Unit is lightweight, ...as no moving parts.—Elec Merch, June, p136

Boilers Standardized—Six new standardized boilers in Springfield Boiler Co.'s type M line range from 7,500-17,000 lb. per hr. Tube lengths are 10 and 12 fet. All boilers have 48-in. dia. welded drums built to pressure from 160-320 psi. Setting height is 18 ft.—Oper Eng, June, p78

Electrically-heated Rubber — Electrically-heated rubber of the wire-resistor type, developed by B. F. Goodrich Co. is heat- weather- and oil-resistant. Constructed of resistance wires insulated with fabric piles sandwiched between layers of rubber, it is available in almost any desired size, shape, or weight. Parallel wires run length of the rubber. Rubber is satisfactory up to 300° F.—Coal Age, June, p196

Metal Air Filter—Cleanable filter is made of expanded aluminum-alloy sheets staggered to form baffle pattern of adhesive-coated dust-holding surfaces. Available in sizes suitable for packaged air-conditioning units from 15x20 to 25x30 in., filter is offered by Research Products Corp.—Power, June, p148



BETTER DRYING

Pusey & Jones Corp. has proved commercially its "Vitalizer" in drying of milk, newsprint, and boxboard. It is a rigid cylindrical structure fitting inside dryer shell. Resulting annular space is divided by baffle fins extending length of dryer. Steam is admitted at several points along fins and travels at high velocity, thus preventing formation of gas and air films. Condensate is ejected inward to prevent its retarding drying.—Paper Ind & World, May, p257

New Products (Cont.)

Makes Steel Tubing Rust-resistant—Electrically welded steel tubing is made rust-resistant by depositing a 0.0003-in. coating of phosphate by Vinsynite process and then treating the pipe with a vinyl resin. Piping is suited for outdoor use. It resisted a 2,000-hr. exposure to salt spray and showed no bad effects after the equivalent of 5-yr. outdoor exposure. Jones & Laughlin Steel Co. manufactures the pipe; Thompson & Co. developed the pretreatment process and vinyl resin base.—Business Wk, June 4, p52

Cuts Profile Costs—Over a 1-mi. moderate roughness test course, Stanolind Oil & Gas Co.'s elevation meter showed an average variation of about 0.3 ft. Surveying costs were reduced greatly. Mounted in a vehicle and connected to one wheel, the unit will profile any terrain over which the vehicle can pass. —Eng & Min J, June, p108

Moves Sheets or Bundles—For handling sheet metal or bundled materials by overhead hoists, a fulcrum-action, 3-ton capacity grab is adjustable from 12-42 in. wide and 10 in. in height. Wide-angle jaws permit clearance of cross members on skids. Two end hooks support materials 10-12 ft. long and prevent slippage.—Factory, June, p204

Eliminates Check Strap—A new picker-stick check motion eliminates check strap on looms. It protects looms against serious slam-off damage and gives more accurate boxing of the shuttle. It is a Precision Research Corp. development.—Textile World, June, p148

For Perishable Air Cargoes — Foster-Built Bunkers Inc. is offering a low-cost, dry-ice cargo refrigeration unit for safe transportation of fruits, frozen foods, or flowers by air. Constructed of aluminum, unit holds dry ice over a 2-in. air duct. Fan, operating on 24-v. current and drawing 6 amp., circulates air throughout freight area. A 200-lb. capacity unit weighs about 50 lb.—Aviation Wk, May 23, p35

Vertical Turbine—Whiton Machine Co.'s new turbine develops 90 bhp. and meets need for vertical-unit drives. It can be used for practically any steam pressure and temperature. Flange at bottom allows bolting to flange of driven equipment.—Power, June, p144

Easy Workholding—Kearney & Trecker Corp. has developed knee-type milling machines that incorporate a built-in chucking table. It can handle irregularly shaped work-pieces without use of costly special tools and fixtures. Three types of vise jaws can be mounted on master jaw bases on the table to hold different kinds of work. Machine sizes are Nos. 4 and 5.—Am Mach, June 16, p134

"Windows" Match Corrugated Metal—For use in industrial buildings with corrugated metal exterior, Rohm & Haas is manufacturing a translucent acrylic plastic "window" strip to admit diffused light. Sheets are ⅛ in. thick and measure 33x51 in. Corrugations match those of fluted metal. Sheets can be used on side wals or in skylights.—Con Meth, May, p75

Seals Transparent Boxes—Electronic corner stayer, made by Spectrum Mfg. Co., seals corners of transparent boxes without cement. It may be used for acetate tubes and handle containers up to 5-in. seam length.—Elec tronics, June, p198

Diaphragm Valves—Designed for service up to 150 psi. and 180° F., Crane Co.'s new diaphragm valve uses diaphragm only to seal the bonnet. A separate seating member, giving positive flow control, reduces diaphragm flexing. Sizes are ½-4 in.—Prod Eng, June p188

COMPLETE 60-IN. KITCHEN

Stove, refrigerator, sink, drainboards, and cabinet space are in a 60x25x84-in. space in General Electric Co.'s new kitchen unit. Stove has three 5-heat Calrod surface units and a full-sized oven and broiler. Refrigerator has 8½-sq. ft. shelf area. Both right and left drainboards are provided.—Elec Mer May, p135

leans Compressed Air—Liquid separation, gitation, drying, spraying, and other operaons of instruments and pneumatic mechaisms are simplified by Selas Corp. of Amer-a's new "Liqui-'jector." Phase separation d liquid ejection are done by two ceramic bes, one water-repellent and the other ater-permeable but air-impervious. Rate of ater ejection ranges from 0.5-2.5 gal. per 24 . Particles finer than 100 microns dia. can removed by the unit.—Auto Ind, June 1, 1

ngine-driven Welder—Repair shops and ntractors will find many uses for Miller lectric Mfg. Co.'s model AEA-200 420-lb. ngine-driven ac. welder. It will deliver 200 mp. at 60 c. and handle electrodes up to /16 in. Engine is two-cylinder, four-cycle r-cooled unit.—Weld Eng, June, p44

igh-speed Tapper—Dorman Machine Tool orks has introduced a high-speed autoatic-reverse tapping attachment with full-oating chuck jaw. Capacity in steel is ⅜-⅞ . for hand or machine screw taps and ¼-½ . for pipe taps.—Iron Age, May 19, p105

oldering Pliers—Durst Mfg. Co. is offering odel CA-6-199 electric soldering pliers. Wires or parts to be soldered are held by e pliers while a foot switch closes the cir-it for an instant to heat the contact point ng enough to melt the solder.—Electronics, ne, p181

afety Receptacle—Harvey Hubbell, Inc.'s ew SP-49 receptacle reduces possibility of hock caused by inserting metal objects into all outlets. Operating feature is four in-ulated rollers, two of which have to be en-aged simultaneously to energize unit.—Elec &M, June, p102

ammered Finish—Sherwin-William Co's equer Dimenso gives a hammered finish in wo colors applied in one operation. Applied y spraying, it dries in 20 min., needs no aking. It is suitable on metal, wood, plastics. —Am Mach, May 5, p152

olishes Aluminum—Chemical polish for luminum, known as Chemlustre, is applied y immersing parts in 160-180° F. solution r ¼-2 min. and rinsing in cold water. Luster epends on immersion time. Product is made Chemclean Products Corp.—Prod Eng, une, p196

hecks Warp Ends, Filling Picks—Number f warp ends and filling picks per inch is asily determined by a vest-pocket-sized ounter developed by Micro-Lite Co. Instru-ent produces a sharp moire pattern against he weave by means of converging lines en-raved on the transparent counter. Counter aves time, reduces eye strain, and is 100% ccurate.—Textile World, June, p146

4-WHEEL DRIVE ROAD SCRAPER

Two 190-hp. engines, one at front and one on rear axle of scraper, give added traction in soft ground to this Euclid Road Machinery Co. unit. Hydraulic drive synchronizes engines. Torque converter permits shifting to any gear at full load. One operator controls both engines.—Business Week, May 28, p38

Reduce Fog-driving Hazard—Amber-colored ethyl cellulose headlight covers can be attached to headlights by suction cups to reduce hazards of driving through fog. Covers cost about one-tenth as much as fog lights. They are a development of Gits Molding Corp.—Mod Plastics, June, p85

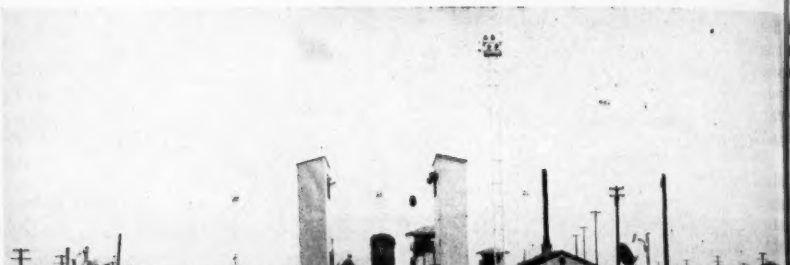
Self-washing Filter—Completely automatic, self-washing air filter has 20x20x4-in. banks inclined at 30° to air flow. Number of units is varied to suit air volume requirement. It is offered by Farr Co.—Oper Eng, June, p66

Compact Gas Furnace—Borg-Warner Corp.'s model GHF 62-5 gas-fired furnace has 62,500-Btu. capacity, yet is only 12¼ in. deep, 32 in. wide, 88 in. high. It may be installed as forced-air space heater or ducts can be connected to built-in plenum chamber for use as blower-driven furnace.—Am Builder, June, p136

Directs Conveyor Traffic—Flow of cartons and packages can be automatically merged and directed either right or left along a single conveyor line by Alvey-Ferguson Co.'s MergA-Flow. Control is obtained by electrically interlocked gates and adjustable deflector.—Food Ind, June, p142

READER SERVICE

As a special service to our subscribers, McGraw-Hill Digest will furnish without any charge, additional information about any new product or technical development described. Address your letter to: The Editor, the McGraw-Hill Digest, 330 West 42nd St., New York 18, N. Y., U. S. A.



Freight cars approaching a hump must run the gauntlet of inspection installations. These..

Humps Speed Freight Handling

Safe, speedy, economical hump-retarders combine car classificatio and inspecting. Radio has speeded yard operations great

COUPLED with new mechanical and communications developments, the hump-retarder yard is finding increasing popularity with American freight yard men as a means to speed handling of cars in the yard. Increased attention is being paid to the design, construction, and maintenance of the main yards and smaller yards at interchange points and even industrial yards as well.

As the war brought unprecedented of cars. Freight-train speeds have been increased 22.7% since 1929. Net ton-miles per train-hour have risen 77.5% over the same period. Trains are longer.

As the war brought unprecedented loads to the freight yards, the yards turned to modern communication methods to handle this additional load.

Yardmaster was placed in a tower in the center of the yard with radio contact with switching crews. This reduced waste motion and idleness while crew await instructions. The radio system were supplemented with teletype lines fo transmittal of consists.

These facilities—coupled with th hump-retarder yard—was found to b the most efficient means of classifyin freight cars.

The hump-retarder is a speedy, saf economical means of car classificatio By pneumatic tubes the conductor of a incoming train relays way bills to yar office in seconds. Before the train reache the yard, teletyped consist has been r ceived from the last terminal and prep rations, including switch lists, have be made for prompt disposition as the tra arrives.

Yard locomotive moves cars to hum lead, movement being controlled by th conductor of the hump by light signa or radio. As cars move up lead an inspe

ion device checks for dragging equipment. Car passes over a pit inspection station and if defects are noted the car's wheels are sprayed with whitewash and car is shunted to a repair track for necessary repears.

Cars move down the hump-retarder to classifying track where trimmer engines gather cars and move them to departure tracks. Car numbers are relayed from the departure tracks by "walkie-talkie" radio to the yard office. Almost as soon as the last car is reported the waybills are ready for the outgoing trains conductor.

Tracks in the departure yard should be sufficiently long to obviate "doubling" of trains on more than one track.—Railway Age, May 21, p141

Jack Floor Down Into Place

Since equipment in Los Angeles' telephone building could not be interrupted while a new building was being built, the old one-story building was dustproofed and a new three-story building built around it. Old structure was sealed into a dustproof plywood box, the roof being covered with Sisalkraft paper.

New building is of all-welded, rigid-frame steel bent design. Floors are reinforced concrete. After roof and columns were complete, second floor beams were welded to brackets on columns. Floor slab and fireproofing were placed, the roof of the old building serving as a working platform.

A threaded 1½-in. rod was hung from a temporary bracket column extending down through yokes on each beam. Nut was run down on each beam bracket. The resulting jacking system resembled a slip-form jack-rod arrangement in reverse. Using 6-ft. long wrenches, workers lowered the floor 1/24 in. at a time, a half-turn of the nut at a time.

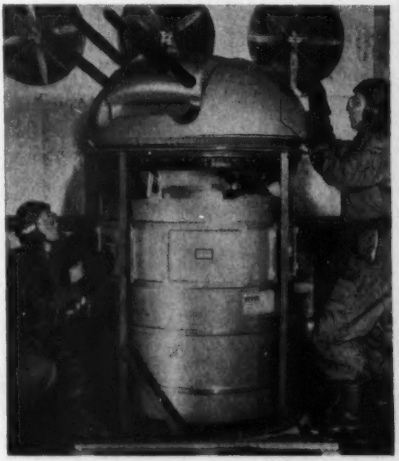
When floor level was reached permanent brackets were welded to the bracket and beams and jacking system were removed.—Cons Meth, June, p37

Controls Ingredient Flow

Two flow-control systems made by Buffalo Electronics Corp. can be applied wherever dry ingredients are combined to form a product. Example applications include feed milling, dry cereal milling, coffee blending, feeding dry adhesives.

The Signa-Flow has a flow detector in the form of a small needle that protrudes into the stream of material. This needle "feels" the material moving past it and sends a signal to an electronic amplifier. If the flow stops, the signal stops, causing a relay to operate a warning light and horn.

A somewhat similar development is the Blentrol system. Whereas the detector system provides a start-stop control, the blending system provides a control proportional to the material flow. Thus, it can hold two streams in a constant ratio. —Food Ind, June, p54



"COLD BOX" TESTING

B-50 bomber turrets are tested at —65° F. at General Electric Schenectady plant. Besides tests at this temperature, which is normal for 40,000-ft. altitude, turrets are subjected to severe strain, simulating high wind velocities, and shock.—Steel, June 6, p123

Tricky Spot Welding Aids Sales Offer of "Twin" Cans

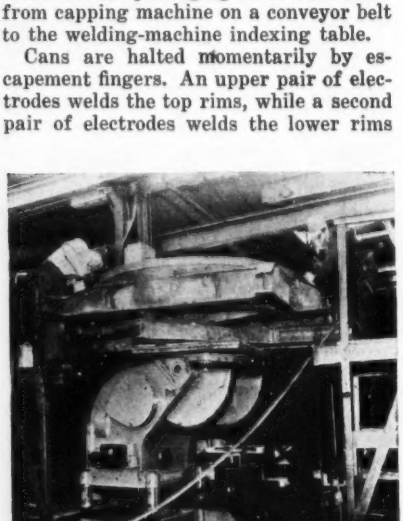
Two cans welded together at top and bottom rims was the idea advanced for a special two-for-one sales offer of Johnson floor wax. Welding cans together was preferred to taping or tying them.

Doing the job was more difficult, as welds had to be strong enough to hold together during handling and shipment and yet weak enough so a woman could easily separate the cans.

The machines designed to make the two spot welds needed at top and bottom rims of the can are wholly automatic and are fitted into the packaging lines. Cans move from capping machine on a conveyor belt to the welding-machine indexing table.

Cans are halted momentarily by escapement fingers. An upper pair of electrodes welds the top rims, while a second pair of electrodes welds the lower rims through a slot in the indexing table. Welds are accurately controlled with variations in squeeze, weld and hold times by increments of 1/60 sec.

Machines are able to operate continuously for 3 hrs. for a total of 14,400 consecutive welds on pint cans. This gives a production of 80 pairs of pints per min.—Weld Eng, June, p30



POSITIONS LARGE WORK

Chipping, grinding, and welding of large castings or other parts are typical uses for this Worthington Pump & Machinery Corp. positioner. Work is clamped on T-slotted table top and can be rotated or tilted to nearly any desired position. Machine is available in several sizes.—Foundry, June, p130

Modern Bus Garage Lighting

Bus maintenance can be improved by proper lighting. The necessity for high ceilings and ample turnaround room emphasizes the need for a well designed and properly installed system. Relighting existing garage will be limited by existing physical conditions, but these conditions can be overcome.

Relatively low ceiling areas should be devoted to storage and minor servicing facilities. Filament lamps in industrial reflectors will probably suffice here. In circulation and maneuver areas, relatively low levels of light—5 foot-candles—will suffice. High ceilings in the major maintenance areas may require continuous row fluorescent units.

For pit work, portable adjustable incandescent units are available. Three-lamp 245-w. fluorescent units attached to pit wall will provide a shadowless working area beneath bus.—Bus Trans, June p86

Reduces Pickling-Room Fog

Low visibility because of vapor condensation above pickling tanks was eliminated at Jones & Laughlin Aliquippa Works by installation of air heaters.

Four Dravo Corp. counter-flo heaters each having a heating capacity of 2 million Btu. per hr., were placed in a lean-to outside the shop. Heated fresh air was then directed into the shop at a velocity of 2,000 fpm. through wall openings 12 ft. above the floor. The warm air blanket reduces the condensation rate.—Iron Age, May 26, p79

ew Knitting Equipment

proved machines, supplies and meth-s for knitting—especially nylon—were atured in displays at the 1949 Knitting ts Exposition. Whitin Machine Works played its new Model C-2 tricot-knit-g machine which operates at 400-450 urses per min. Gages are 14, 28 and ; needle bar is 168 in. long. An op-nal attachment is a needle bar using utted" needles. It speeds removal and placement of broken needles.

To eliminate waste, Supreme Knitting achines Co. has placed synchronized tters on striping machines. Each riping feed is equipped with a cutter, tting being synchronized to striping um. A new single-head full-fashioned achine, developed by Weldman Mfg. ., produces 54- and 66-gage hose.

Boarding is eliminated in Industrial yer Corp.'s conditioner for pre-setting siery. A 20-min. period at 205° F. at % relative humidity plus a drying riod is used. One mill has used the unit handle gray hose as they come directly om the knitting machine.

Using Bakelite barrel, heads, and bear-gs, Allentown Bobbin Works' hollow-nstructed bobbin needs no reaming. he barrel forestalls crushing of the lon yarn.—Textile World, June, p118

educes Bus Storage Bill

leveland Transit System will install oster heaters on the 180 buses stored utdoors during the winter. Saving rough use of heaters is expected to be 00 per year per bus. Two types will e used—one operates from 220-v. cur-ent, the other is gasoline- or diesel-fuel red. The latter type warms the pas-enger compartment simultaneously with ngine.

Saving will be realized by eliminating uel consumption during warm-up idling nd through less engine depreciation. Boosters heat the water in the engine's ooling system.—Bus Trans, June, p55

MINERAL-FREE WATER

Cartridge demineralizer, trade-named Filt-R-Stil by American Cyanamid Co., delivers distilled water at 10 gph. A disposable cartridge contains ion-exchange resins. Water flowing through cartridge emerges essentially mineral free—no more than 10 ppm. of dissolved ionized solids, exclusive of silica.—Food Ind, June, p144

Howls When Boiler Smokes

Boiler firemen can be given audible incentive to correct the cause of any excessive smoke by the installation of a new smoke alarm. A phototube detector, made by C. G. Conn Ltd., indicates the degree by which the furnace is exceeding a predetermined level of smoke density. As the density increases, the intensity and frequency of the audio tone is increased proportionally, thus creating a disagreeable howl from the loudspeaker. —Electronics, June, p77

Cuts Maintenance Cost 60%

SKF Industries, Inc., has reduced maintenance costs 60% by performing major maintenance work during the 2-week shutdown for summer vacations. Maintenance is departmentalized, a foreman heading each of the millwright, electrical, lubrication, carpentry, and housekeeping sections. These men plan schedules well in advance of the summer shutdown.—Factory, June, p88

Meeting Features Gas Uses

Gas men at convention discuss many aspects of acetylene applications plus results of investigations conducted on processes and equipment

TECHNICAL SESSIONS of the 1949 annual meeting of the International Acetylene Association pointed up new developments in the gas-welding industry and new uses for older processes.

One paper dealt with stack cutting by the flux-injection method. This process, developed for cutting stainless steel, is readily adaptable to cutting of mild steel in stacks with little or no clamping.

Air gaps that would stop the cut in conventional operation have no effect in flux-injection cutting. Gaps as great as ¼ in. can be "jumped" without loss of quality or cutting effectiveness.

Reported also were the results of an investigation on pressures developed by explosions of flammable gases in piping. Test explosions were produced in closed pipes with the flammable mixtures being ignited by a spark plug.

Conclusions were that in laying out an acetylene piping system approved flame arresters should be installed where piping joins larger pipe or other equipment such as meters, receivers, compressors. Standard-weight steel pipes up to 3 in. dia. can be expected to withstand even the most severe detonation pressures without rupturing.

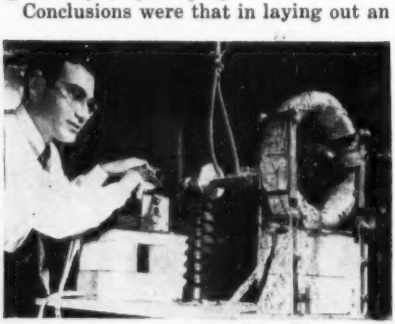
A paper on flame-deseaming, or scarfing, in steel mills gave specific recommendations on methods and layout. When billets 2 x 2 in. to 5 x 5 in. square and up to 10-20 ft. long are to be conditioned, a table can well be used. Gases are piped to the center of the table, and torch hose suspended from a swinging overhead arm.

Larger billets and slabs are best worked on the floor. Steel blooms, 8 x 8 in., make good skids on which to plan the work. Slabs are easily handled by magnets, especially with a low gantry crane. The magnet can be attached to the ram, thereby eliminating cables and making spotting much easier.

Torch selection for scarfing slabs is important. By using a 36-in. torch, a 40-in. wide slab can be skinned in 37 cuts. If the 40-in. slab is 90 in. long, complete surface removal can be accomplished in 36 min.

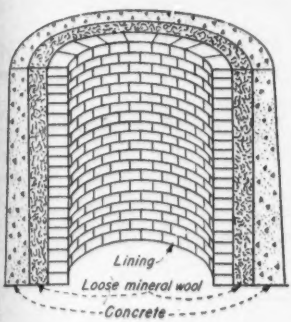
A 44-in. torch can scarf such a slab in 25 min. with about 25 cuts. Another 40-in. torch with a ½-in. hose can scarf this size of slab in even less time, only 15 min. One objection raised by operators to the last torch is the excessive heat caused by the large tip.

Machine scarfing also is contributing to greater output and lower costs at the final conditioning docks. By this method the surfaces of various sizes of square billets can be removed completely at the delivery side of the mill.—Weld Eng., June, p17, 20



IMPROVES X-RAY TUBES

Experimental apparatus developed at Stanford University improves tube efficiency. Large coil produces rotating magnetic field that moves focal spot of electron beam in circle on target face to distribute heat over greater area. Motor-driven lathe attachment gyrates entire tube to keep external X-rays at fixed point of focus despite wiggling of electron beam.—Electronics, May, p126



INSULATES CHIMNEY

...rge chimney, built by International Nickel ... of Canada, Ltd., has loose mineral wool ... insulation to avoid production of destruc... internal stresses. Concrete shell had to ... protected from temperature drop through ...ge of 800° F. gas inside to −50° F. out... Mineral wool in 4-in. space of 62-ft. ... chimney does not settle because fibers ...rt internal pressure in all directions.— ...ver, June, p128

...y Mix Best for Dinnerware

...peration of a dry-mix, semi-vitreous ...nerware plant simultaneously with a ...t-mix plant proved to Universal Pot... ...ies Inc. that the former plant was ...re economical. Labor force was 57% ...er, equipment investment and space ...re reduced, maintenance was much ...er.

...All clay and body components are de... ...ered to the dry-mix plant in 50-, 70-, ... 100-lb. bags. Necessity for scales is ...minated since incoming bags are spot ...ecked for weight. Bags are all opened ...a vented room, eliminating dust within ...e plant.

...Dry batch is agitated for 3 min. before ...p is added. Then the batch is agitated ... 12 min. With 28 batches produced in ...-hr. shift, plant has a 35-ton-per-shift ...pacity.—Ceramic Ind, June, p90

Ceramal May Prove Answer As Turbine Blade Alloy

A combination of ceramics and metal, "Ceramal" may prove to be the long-sought material for turbine blades. It has passed severe tests where the other two materials have failed. It is hoped that Ceramal will permit increased development of heat in the engine. If maximum permissible cycle temperature in present engines were doubled, thrust per unit of frontal area could be increased 247% and thrust per lb. of engine weight 172%.

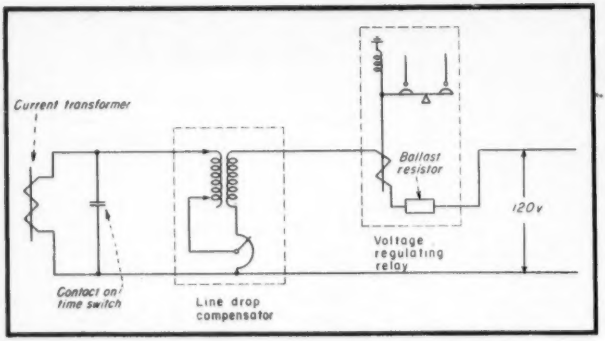
Earliest Ceramal experiments were conducted in Germany. One of the most promising ones developed in the U. S. is a carbide type, 80% titanium carbide and 20% cobalt. It has relatively high thermal conductivity, a low thermal expansion, a modulus of elasticity of 55-million lb. per sq. in., and good tensile strength

High thermal conductivity enables Ceramal to transfer heat to turbine wheel rapidly, which permits blade to run cooler than a metal-alloy blade on the same wheel. Their low specific gravity gives a reduction of one-half to two-thirds in weight of comparable metal-alloy blades.

Tests have been run on rotors with three ceramal blades equally spaced about the disk. The remaining 139 blades were standard. At 2200° F., Ceramal blades showed a short-time tensile strength of 13,200 lb. per sq. in.—Aviation Wk, May 23, p26

World's Largest Gas Line

Now being planned is construction of a pipe line to carry natural gas from Alberta, Canada, to California. Proposed line will be 30 in. in dia. and 1,400 mi. long, which would make it the largest gas line and one of the biggest and longest pipe lines in the world. The line will cost an estimated $175-million.—Oil & Gas J, May 19, p166



HOLDS VOLTAGE

Voltage-regulatio problem where bot industrial and reside tial loads are supplie was solved temporari by time switch. Th switch inserts lin drop compensator voltage-regulating r lay circuit to ho proper voltage fording evening residenti ots a t load. In daytime, con n. Dee pensator setting is n satisfactory, th um ma necessitating tim n Mach switching. — Ele World, June 4, p84

Safety with Air Clamping

Safety considerations in use of compressed air to work-holding fixtures fall into two classes: (1) points of mechanical design of air-operated fixtures intended to prevent possibility of injury to operator and (2) use of compressed air to operate safety devices, such as retractable guards.

In incorporating air-operated clamping to fixtures, a safety practice is to restrict piston travel so clamp moves about 1/16 in., just enough to apply pressure to work and to release it. This small movement prevents operator from putting fingers between clamp and work.

Means must be devised, however, to allow workpieces to be inserted and removed easily. Typical methods are knuckle-joint clamps, swinging jig plates, and gate jigs.—Mach, May 28, p163

Multiple-Unit Castings

To save handling time, Oldsmobile Div., General Motors Corp., combines several similar parts in one casting, machines them, then cuts them apart. Two jobs are now being done this way—main bearing caps and rocker-arm-shaft brackets.

The five main bearing caps are finished on four machines. Operations include broaching, milling, drilling, reaming, tapping, sawing, and finally turning a segment on the left end of the rear main bearing cap.

Many gated castings can be machine as a unit. Added economies can be mad by shortening runners and increasin pieces per plate.—Am Mach, Apr 21, p8

New Oxo Process Offspring

New Du Pont product is long-chain alc hol made by Oxo synthesis. From diis butylene, carbon monoxide, and hydr gen, Du Pont makes an aldehyde whic is hydrogenated to the new alcohol- trimethylhexanol.

Chief use will be in production of pla ticizers. For this use, alcohol will esterfied. Among esters are sulphate phosphates, adipates, maleates, a phthalates. Other uses are in surfa active agents, lubricating oil additive and specialty printing inks.—Chem En May, p72

French Super-Airliner

Prototype of France's new SE 20 *Armagnac*, shown at the 18th Paris A show, has been flown. Air France h ordered 15 ships for its Paris-New Yo route. The 94-passenger ships will ha a gross weight of 73 metric tons.

Four Pratt & Whitney engines w provide a cruising speed of 400 mp —Aviation Wk, May 30, p16

etermines Steel Formability

method to determine the formability steel was developed by U. S. Steel researchers in trying to find a good steel bottle caps. They discovered that inherent magnetic property controls rmability.

The property is measured with a reding torque Magnetometer, which ts a torque curve for any steel in 6 n. Deep-drawing steels must have minum magnetic directional properties.—n Mach, June 16, p133

egular Gas Satisfactory

asoline having an octane number of 80 esearch will give knock-free operation r all normal driving conditions in about % of the automobiles. Similar comtely knock-free operation in the other % can be obtained with a gasoline of research rating. But highest octane quirements are encountered infreently. In about two-thirds of pasnger cars, the maximum requirement curs during acceleration in high gear speeds below 25 mph.

On the average, therefore, maximum tane number is needed only 10% of the time. So the average gasoline is satisfactory 96% of the operating time. —Oil & Gas J, Apr 21, p190

Determines Heat Abstraction by Various Mold Materials

A practical method to determine the relative rate of heat abstraction by various molding materials has been developed at Allis-Chalmers Mfg. Co. Tests on a variety of materials gave these results of interest to the foundryman:

1. Clay-bonded sands have a greater capacity for heat abstraction than do oil-bonded sands.

2. Chilling by cast iron, used as a chill, is 10 times greater than that of regular molding sand.

3. Heat-abstraction rate for a molding material is proportional to the apparent density for similarly bonded material.

The testing method is simple. It consists of pouring a weighed amount of molten cast iron at 2560° F. into a certain size mold made of the molding material. Temperature readings are taken at 1-min. intervals for 30 min. Cooling curves are then plotted.—Foundry, June, p96

How To Cut Costs

Cost Cutting Is Management's Big Job Today

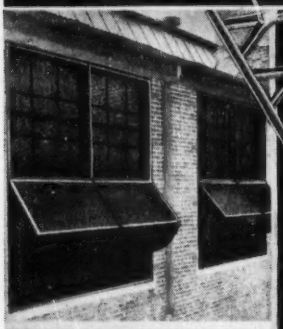
In subsequent issues of the McGRAW-HILL DIGEST we will continue to tell the story of how you can cut costs in your business. Rising costs and tightening markets make this managerial subject your most important problem. It will keep your products abreast of your competitor.

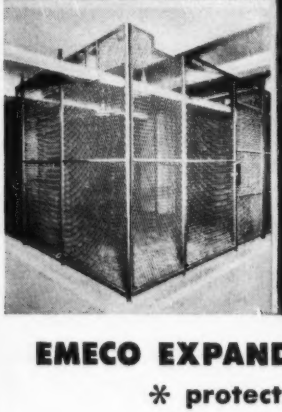
The September issue of the DIGEST will tell you how to cut costs through better design. Better designs affect almost every industry. You can learn new tricks from this coming "Report to Management."

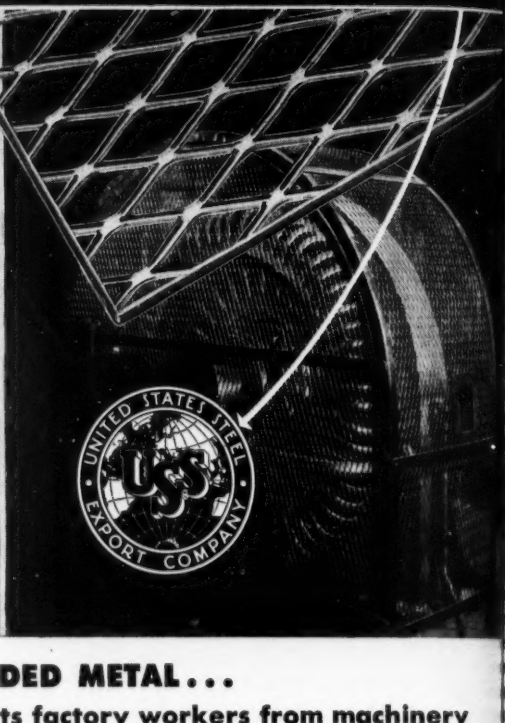
January 1950 issue will do a complete roundup on cost-cutting ideas in all branches of industry. "How To Cut Costs" will be a 24-page bonus in that issue. You cannot afford to be without these new ideas that this roundup will convey.

In intervening months the DIGEST will continue to bring you other phases of cost cutting important to you.—The Editors

STEEL FOR THE WORLD OF TOMORROW







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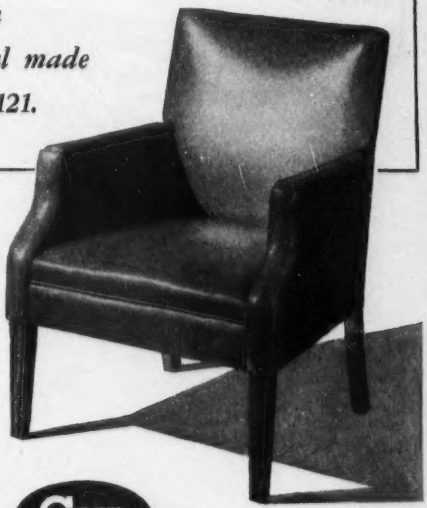

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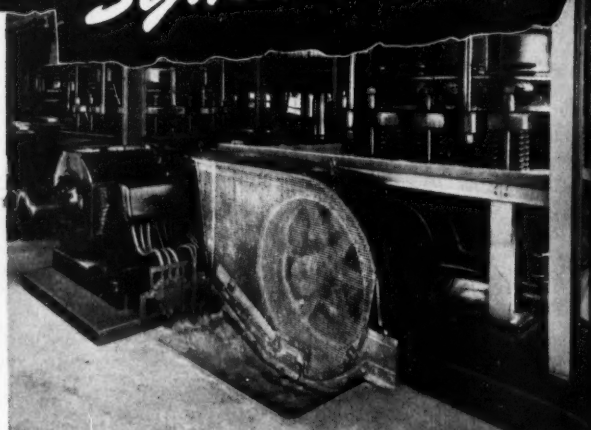

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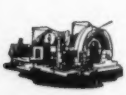

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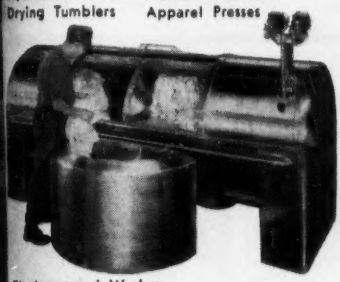

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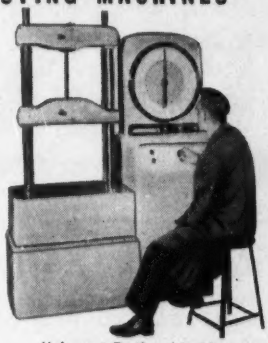

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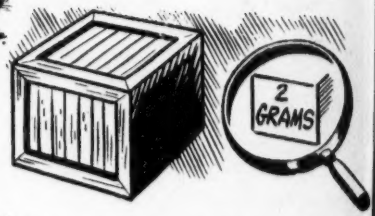

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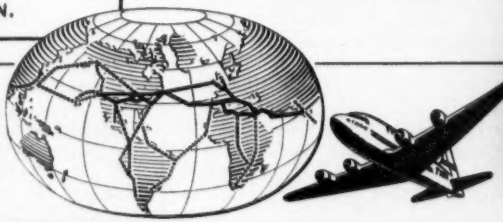

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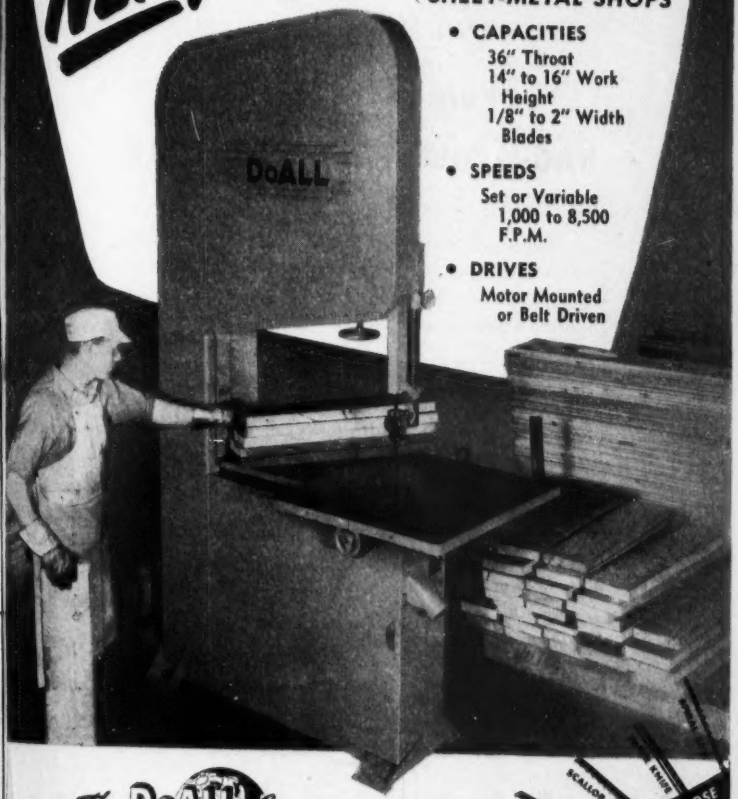

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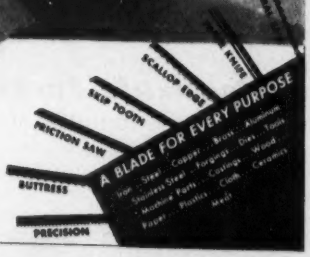

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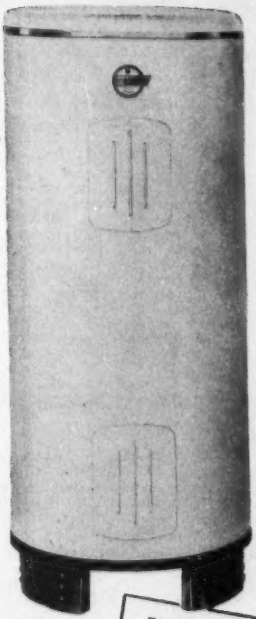

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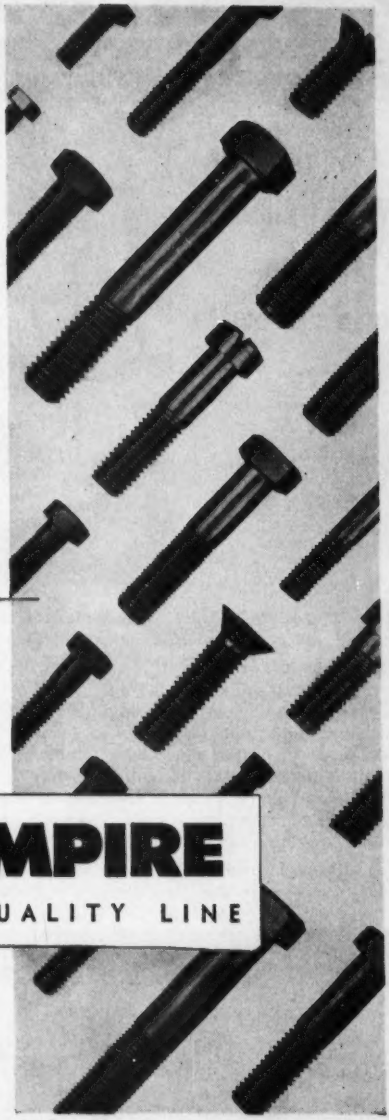

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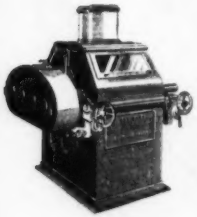

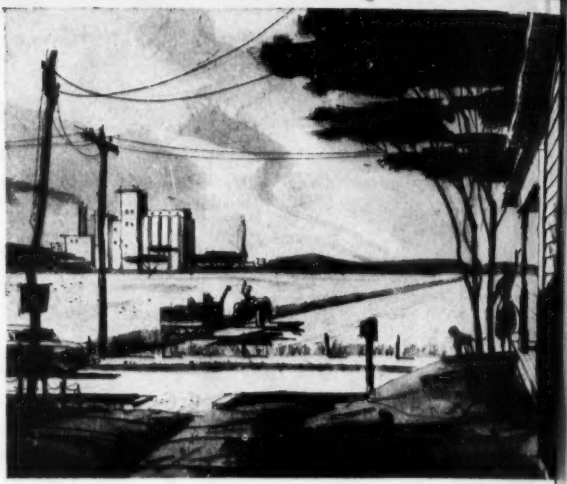

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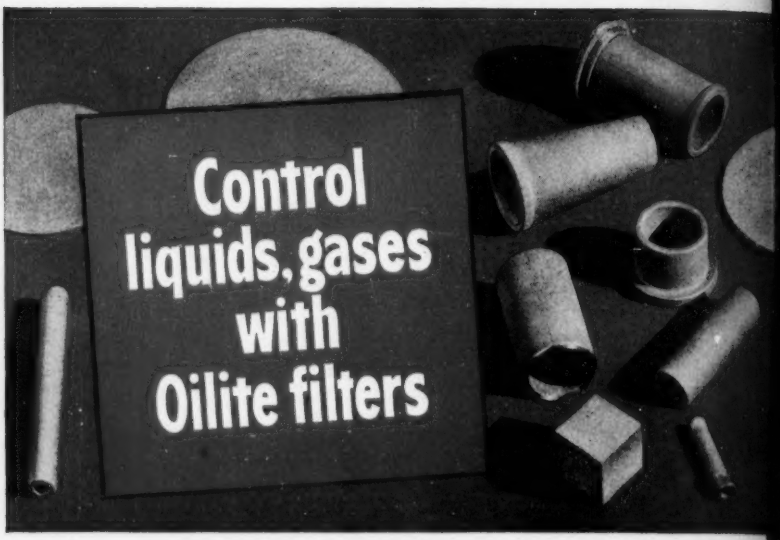
Stokes makes Semi-Automatic and Automatic Molding Presses, Plunger Presses, Closure Presses, Preforming Presses, Industrial Tableting and Powdered Metal Presses, Vacuum and Special Processing equipment, Water Stills and Special Machinery.

STOKES KNOWS HOW



Oilite powdered metal filters serve you in many ways.

You can use them for screening, metering, mixing, venting and flame arresting, to name a few. Thus, they help you control many liquids and gases.

You can get Oilite cone, cylinder, plate or tube filters of up to *eighty per cent porosity* pressed to your exact specifications. You can get them pressed from powdered bronze, brass, copper, iron or other metals and alloys. And you can get them in sizes from a quarter-inch in diameter up to filtering areas measured in feet.

You can also get Oilite bearings and machine parts . . . with or without the self-lubricating feature. Cored and bar stock, strip and plate stock are available for emergency or experimental use.

So, if you work with gases or liquids, investigate Oilite *today!*

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